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GOLD STANDARD FOR THE GLOBAL GOALS (GS4GG) REPORT

-

DESIGN CERTIFICATION (VALIDATION of VOLUNTARY PROJECT ACTIVITY (VPA))

Project Title:	GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India
GS project ID:	GS 12220
Internal ID:	TQC 21623
Customer:	EKI Energy Services Limited
Date:	12/02/2025
Revision:	4.0

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SUMMARY			
Reference No.	**Date** *(first version)*	**Version No.**	**Date** *(last version)*
TQC 21623	17/05/2024	4.0	12/02/2025
CME	EKI Energy Services Limited		
VPA Title	GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India		
Coordinating/Managing Entity	EKI Energy Services Limited		
VPA Location	Host Country: India Rural areas in Dindori and Anuppur districts, Madhya Pradesh, India		
Contact Person	Mr. Manish Dabkara		

GS4GG Version: GS4GG Principles and Requirements version 1.2[/5/] **GS4GG Activity Requirements:** Community Services Activity Requirements, version 1.2[/5/] Programme of Activities Requirements, version 2,1[/5/] Gender Equality Requirements & Guidelines, version 1.1[/5/] Stakeholder Procedure, Requirements & Guidelines, version 2.1[/5/] Safeguarding Principles & Requirements, version 2.1[/5/] **Applied Methodology Version:** Methodology For Emission Reductions from Safe Drinking Water Supply, version 1.0[/4/] The following tools and guidance's have been followed (References): Tool 30: Calculation of the fraction of non-renewable biomass, version 4.0[/4/]	GS4GG Principles and Requirements V 1.2 UNFCCC CDM Sectoral Scope: 3 GS4GG Scope: 2 Technical Area: 3.1
GS4GG First VPA-DD Version: 01 Date: 12/06/2023	GS4GG Final VPA-DD Version: 04 Date: 07/02/2025
Estimated Annual Emission Reductions: 5,745 tCO_2e per year	
Selected Sustainable Development Goals (SDGs): 1, 3, 4, 5, 6, 7, 8, 12, 13 and 15 **Estimated Sustainable Development Contributions:** **SDG 01 (No poverty) -** SDG indicator 1.4.1: Total number of premises with at least one water filter distributed / installed under the project: 2,010 no. of water filters distributed. **SDG 3 (Good Health and Well Being) -** SDG indicator 3.9.1: Mortality rate attributed to household and ambient air pollution: 100% **SDG 4 (Quality Education) -** SDG indicator 4.3.1: Number of employees who have undergone skill development training: 1 employee	

SDG 5 (Gender Equality) -

SDG indicator: 5.4.1: % users reporting time-saving due to reduction in collected fuel consumption/cooking time in the project: 100%

SDG 6 (Clean Water and Sanitation) –

SDG indicator: 6.1.1: Proportion of population have access to improved source of water: 10,774 numbers

SDG 7 (Affordable and Clean Energy) –

SDG indicator: 7.1.2: Total number of premises with at least one water filter distributed under the VPA: 2,010 no. of water filters

SDG 8 (Decent Work and Economic Growth) –

SDG indicator: 8.5.1: Total no of jobs created (in distribution, Monitoring & Evaluation): 4 numbers

SDG 12 (Responsible Consumption and Production) –

SDG indicator: 12.2.2: Domestic material consumption (Quantity of wood fuel burned avoided): 369.00 tonnes

SDG 13 (Climate Action) –

SDG indicator: 13.2.2: Total greenhouse gas emissions: 5,745 tCO_2e

SDG 15 (Life on land) –

SDG indicator: 15.2.1: Progress towards sustainable forest management: 3,053.00 tonnes

Design Certification Summary

LGAI Technological Center, S.A. (hereafter referred to as Applus+ Certification) has been contracted by EKI Energy Services Limited to perform the GS VER validation of "GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India" (GS VPA ID: GS 12220).

The management of EKI Energy Services Limited who is CME and VPA implementer is responsible for the preparation of the GHG emissions data and the reported GHG emission reductions.

A desk review and an on-site audit have been conducted to verify the data submitted in the GS4GG VPA-DD. Applus+ Certification confirms the following have been reviewed:

a. The GS4GG VPA-DD/1/;
b. The applied monitoring methodology/4/;
c. The Gold Standard for Global Goals "Principles and Requirements" Version 1.2 and other applicable requirements/8/;
d. All information and references relevant to the project activity's resulting in estimated emission reductions/3/.

The purpose of this Micro-scale VPA is the dissemination of Household Water Treatment (HWT) units i. e. water purifiers to approximately 2,000 families which has been confirmed against the submitted project database/22/ within the Dindori and Anuppur districts, Madhya Pradesh, India. The VPA replaces conventional method of boiling water on traditional cookstoves using firewood, through distribution of water purifier.

The scope of the validation is defined as an independent and objective review of the project design document, against the requirement of Gold Standard and applied methodology. The validation report is finalized based on the assessment of the Gold Standard GS4GG VPA-DD/1/, and applying standard auditing techniques including but not limited to document reviews, follow up actions (e.g., on-site visit, telephone or e-mail

interviews) and also the review of the applicable approved methodology and underlying formulae and calculations.

The report and the annexed validation checklist describe a total of 13 findings which include:

- 06 Corrective Action Requests (CARs);
- 06 Clarification Requests (CLs/CRs);
- 01 Forward Action Requests (FARs)[1].

The CME has responded these findings by modifying the Gold Standard GS4GG VPA-DD and providing adequate additional explanations and evidences. Applus+ Certification confirm that all the findings have been "closed out" before submitting the request for inclusion under PoA to GS4GG board.

As a summary of the validation, the review of the Gold Standard GS4GG VPA-DD/1/ and the subsequent follow-up interviews have provided Applus+ Certification with sufficient evidence for the determination of the project's adherence with all stated criteria. In our opinion, the VPA meets all relevant requirements of Gold Standard. Therefore, Applus+ Certification recommends the VPA for inclusion under PoA and registration by the GS4GG Registry as GSVER project.

ASSESSMENT TEAM		
Team Members	**Type of Resource[2]**	**Organization** *(for Oes)*
Lead Auditor/ Technical expert: Mr. Deepak Pundlik	☐IR ☐EI ☒OE	M/s True Quality Certifications Private Limited
Auditor: Mr. Amit Rai	☐IR ☐EI ☒OE	M/s True Quality Certifications Private Limited
Auditor in Training: Ms. Shruti Shrivastava	☐IR ☐EI ☒OE	M/s True Quality Certifications Private Limited
Technical Reviewer: Mr. Simon Shen	☐IR ☒EI ☐OE	Applus+ Certification

[1] FAR was raised as part of preliminary review
[2] IR (Internal Resource); EI (External Individual); OE (Outsourced Entity)

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ABBREVIATIONS	
Applus+ LGAI / Applus+	LGAI Technological Center, S.A. (Applus+ Certification)
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM EB	CDM Executive Board
CL / CR	Clarification Request
CME	Co-ordinating and Managing Entity
DNA	Designated National Authority
EF	Emission Factor
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GS4GG (or GS)	Gold Standard for Global Goals
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
MP	Monitoring Plan
SDG	Sustainable Development Goal
TAC	Gold Standard Technical Advisory Committee
UNFCCC	United Nations Framework Convention for Climate Change
VVB	Validation and Validation Body
VER	Verified Emission Reduction
VVS	Validation and Validation Standard

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1. INTRODUCTION

1.1 Objective

The purpose of a validation is to have an independent third-party assessment of the GS4GG VPA-DD and compliance with the GS requirements as described in the Gold Standard documentation and supporting documents by the CME. Validation is part of the GS VER project cycle and will finally result in a conclusion by Applus+ Certification whether a project activity is valid and should be submitted for registration of a proposed project activity rests at the GS and the Parties involved.

1.2 Scope

The validation scope is defined as an independent and objective review of the VPA-DD, the project's baseline study and monitoring plan and other relevant documents. The information in these documents is reviewed against all applicable GS requirements/5/ including the applied approved methodology. The validation was based on the requirements in the Gold Standard GS4GG requirement i.e. Principles and Requirements, version 1.2, Programme of Activities requirements, version 1.2, Community Services Activity Requirements, version 1.2 and other GS4GG guidance and applicable CDM tool/5/.

The validation is not meant to provide any consulting towards the CME/VPA implementers. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the VPA-DD.

1.3 Description of Project Activity

EKI Energy Services Limited has appointed Applus+ Certification to perform a validation of "GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India" (hereafter referred to as the VPA) in in the republic of India under the PoA – 'Global Household Water Treatment Technology Dissemination Project' (GS ID: 12219[3]) applying the GS approved methodology 'Methodology For Emission Reductions From Safe Drinking Water Supply, version 1.0' and GS4GG guidelines. This validation report summarizes the findings of the validation of the VPA, performed on the basis of requirements of Gold Standard.

Current VPA is a real case VPA in line with the type of project as specified under Key Project Information part of the GS PDD as it is an activity involving single measure implemented (i. e. distribution of water purifiers) under a PoA that follow the framework/requirements set out by an associated real case VPA and PoA.

The project title "GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India[4]" is implemented by EKI Energy Services Limited (CME). The VPA aims to address issues by distributing water purifiers to rural households in Dindori and Anuppur districts, Madhya Pradesh, India who have been boiling water using firewood for their drinking requirements.

The location of the project activity involves:

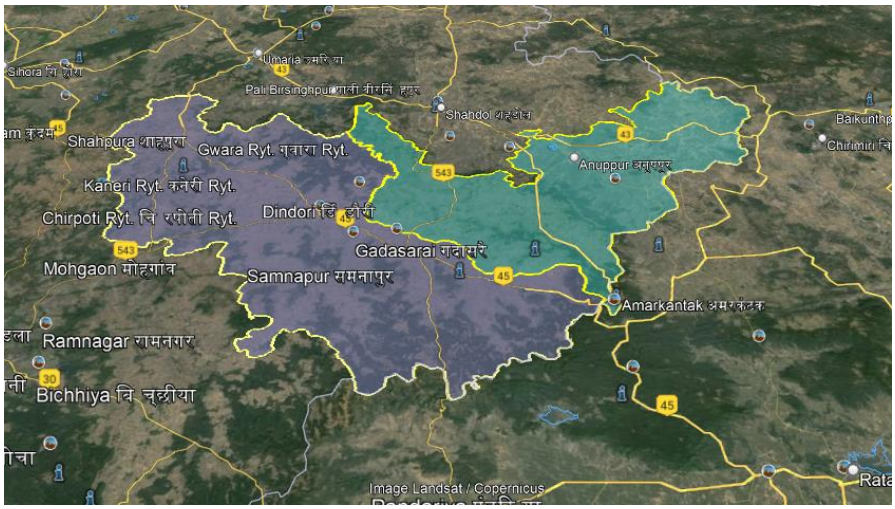
[3] GSF Registry (goldstandard.org)
[4] https://registry.goldstandard.org/projects/details/2669

Host Country: The Republic of India
State: Madhya Pradesh
Specific area: Dindori and Anuppur districts

Thus, the VPA is within the geographical boundaries of the PoA i.e. host country – Republic of India with geographical co-ordinates as below:

Latitude - 23°11'52.89"N to 23°18'40.02"N
Longitude - 81°24'13.69"E to 82° 1'24.23"E

The diagrammatic representation of the project boundary within the Madhya Pradesh state of India is as below as confirmed during on-site visit.



Besides reducing fuel consumption during the water boiling activities and thus reducing greenhouse gas emissions and contributing to climate change mitigation in line with the UN's Sustainable Development Goals[/18/], the VPA has foreseen to provide several SDG benefits for the local families and communities.

The start date of the VPA is 11/05/2023[/14/] which is defined by the date of first project technology that is distributed/sold in the VPA which has been confirmed via the end-user agreement[/6/]. Also, same is in line with the clause 4.1.10 of the Gold Standard Document PRINCIPLES & REQUIREMENTS v1.2 where the project start date is defined as *"For distributed technology projects, the start date is the date of implementation of the first unit under the project"*, as checked and confirmed by the VVB. The designed lifetime of the project is 15 years. The operational lifetime of the VPA is 15 years and 00 months.

As far as project ownership is concerned, it is required that the user consents to the transfer of rights to the carbon credits to EKI Energy Services Limited and collaborates with the team for monitoring purposes, as stipulated in the End-user Agreement[/6/]. The same delineates the responsibilities of both parties and include provisions concerning the transfer of ownership and associated benefits of the carbon credits. Same was cross checked during the on-site inspection

as interviewed from the beneficiaries, and was found consistent with the information mentioned under the section A of the VPA-DD .

By providing water purifiers to communities, the VPA improves access to better basis services/resources at community level through clean water availability.

The distributed household water treatment (HWT) units are named as Econeer/23/ which are manufactured locally in India by GHG Reduction Technologies Pvt. Ltd. EKI Energy Services Limited (CME) work as the VPA implementer and is responsible for distribution and monitoring operations. The summarized technical specifications of the water purifiers that will be distributed as a part of current VPA are as follows:

Table 1 – Technical characteristics of the Econeer/23/

Cartridge Name	Gravity Filter by Econeer	
Types of filters	Hollow Fibre	
Length of Cartridge (mm)	80	
Diameter (mm)	65	
Active Surface area (m²)	0.45216 m²	
Flowrate	Operating Pressure	0.1 -0.3 Mpa
	Under Gravity (10 litre top container, 10 litre bottom container) (at 25 °C)	8 Lit./Hr.
Flow Direction	Outside – in	
Working temp	5 to 35 degrees Celsius	
Claims:	• Bacteria - 6 Log, Virus – 2 logs, Turbidity: Nill • Life of cartridge: 10,000 litres or 2 years (depends upon the intake quality of the water). • Membrane module to be washed every week.	

- **Technology Details**: The water filter uses ultra filtration process which is useful in the treatment of impure turbid water containing suspended particles, pathogens and other harmful microorganisms. It involves water purification process in which water is forced through a Semipermeable membrane with a pore size up to 0.1 micron.

- **Storage Container:**
  i. Water purifier has high-grade stainless-steel container thus there is no chance of regrowth of bacteria as compared to plastic container
  ii. Consists of two parts, lower part of the purifier system is storage container which can hold up to 10 litres of clean water for use.
  iii. A tap is attached in the lower part of the purifier.

- **Cartridge/ membrane:**
  i. **Pore size**: The pore size of the is less than 0.1 microns to several microns.
  ii. **Material:** UF Membrane is based on polymer (polysulfone, polypropylene, cellulose acetate, polylactic acid) which is high quality hollow fibre membrane.
  iii. **Flow rate:** Its filtration rate is 6 to 8 Lit/hr (depends upon quality and temperature of water.
  iv. **Cartridge life:** Its life is up to 2 years or 10,000 litres which one is earlier.

The technical specifications mentioned above were confirmed during the on-site audit through documents shared i.e., technical specification datasheet of the HWT's[18]. The Econeer is manufactured by GHG Reduction Technologies Pvt. Ltd. in India and they have provided a declaration that the manufacturer will not claim carbon credits, if any, from their product.

The eligibility of VPA was checked and the assessment is presented below in section 3.9. Based on the assessment it was confirmed that the current VPA is eligible for inclusion under the PoA.

2. METHODOLOGY

The VPA assessment is based on Gold Standard requirement for GS4GG and is conducted using standard auditing techniques to assess the correctness of the information provided by the CME. Before the assessment begins, members of the team covering the technical scope(s), sectoral scope(s), and relevant host country experience for evaluating the VPA are appointed. Once the VPA is made available for Applus+ Certification, the members of the assessment team carried out:

1. A desk review of the GS4GG VPA-DD;
2. Follow-up interviews with project stakeholders;
3. The resolution of outstanding issues and the issuance of the final validation report and opinion.

The prepared validation report and other supporting documents then undergo an internal quality control before being submitted to the GS4GG Registry.

The GS overview documents which is referred as DVR is as below

Validation Checklist Table 3: Resolution of Audit Findings			
Type:	☐ **CAR** ☐ **CL/CR** ☐ **FAR**	**Number:**	
Raised by:			
Description of the audit finding		**Date:**	
The description of the audit finding should be clearly included here.			
Project Participant's response		**Date:**	
The responses given by the project participants during the communications with the validation team should be included here.			
Documentation provided as evidence by Project Participant			
The evidences provided by the project participants should be included here.			
Auditor's assessment comment		**Date:**	
This section should include how the audit finding is assessed by the assessment team.			

The Complete List of CAR/CL/FAR is included as Appendix 1 of this report.

2.1 Appointment of the assessment team

According to the sectoral scope / technical area and experience in the sectoral or national business environment, LGAI Technological Center, S.A. (Applus+ Certification) has composed a project assessment team in accordance with the appointment rules in the internal Quality Management System of LGAI Technological Center, S.A. (Applus+ Certification).

The composition of audit team shall be approved by the LGAI Technological Center, S.A. (Applus+ Certification) ensuring that the required skills are covered by the team.

The qualification levels for Assessment Team members that are assigned by team members that are assigned by aforementioned appointment rules are as presented below:

- Lead Auditor (LA)
- Auditor (A)
- Technical Expert (TE)
- Technical Reviewer (TR)
- Auditor in Training (AiT) / Technical Expert in Training (TEiT)

The sectoral scope / technical area knowledge linked to the applied methodology/ies shall be covered by the assessment team.

Name	Role	SS Coverage	TA Coverage	Financial aspect	Host country experience

Mr. Deepak Pundlik	LA/TE	Yes	Yes	NA	Yes
Mr. Amit Rai	A	Yes	Yes	NA	Yes
Ms. Shruti Shrivastava	AiT	No	No	NA	Yes
Mr. Simon Shen	TR	Yes	Yes	NA	NA

The complete list of CVs is included as Appendix 2 of this report.

2.2 Document review

The Gold Standard VPA-DD submitted by the CME was reviewed against PoA-DD/1/ which is undergoing design certification in parallel, approved methodology and other relevant criteria/5/ to validate the correctness, credibility, and interpretation of the presented information. Furthermore, a cross-check between information provided and information from other sources has been done. A complete list of all documents and evidence material reviewed is included in Section 4 of this report.

2.3 On-site Assessment and Follow up Interviews

As a part of on-site visit which was conducted during 20/02/2024 to 22/02/2024, VVB interviewed CME representatives, baseline users and end users (as this is joint validation + verification activity) and conducted following activities as a part of pre and post on-site visit which involved joint design certification and performance certification of the real case VPA.

- A complete desk review of the VPA-DD/1/ as well as all applicable host country legal requirements and respective supportive evidences have been checked by the Assessment team.

- Assessment team performed on-site inspection in order to check implementation, current situation, evaluation of data management, QA/QC system, project technology, training provided, monitoring etc. CME representatives were interviewed and cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted.

- Monitoring procedures for ex-post parameters, SDG goals and sustainable monitoring parameters to be followed as a part of VPA

- To review VPA local stakeholder consultation report and grievance mechanism from review of documents and interaction with CME representatives, local stakeholders.

GS4GG document "site visit and on-site visit requirements and procedures" version 2.0/5/ was available at time of on-site visit which mandates VVB to explains means of validation in their assesment which is presented in this report.

The same audit team has performed both validation and verification for combined Design Certification and first performance certification for the current VPA which is accepable under Validation and Verification by same VVB (Ru 2020 Pr – Pr V1.2).

A site visit was conducted on 20/02/2024 to 22/02/2024, details of the same are as below,

Duration of site visit: 20/02/2024 to 22/02/2024				
No.	**Activity performed during site visit**	**Site location**	**Date**	**Team member**
1.	To check implementation, current situation, evaluation of data management, QA/QC system, VPA technology, training provided, monitoring etc.	Multiple villages in the distrcits – Dindori and Annupur, Madhya Pradesh, India	20/02/2024 to 22/02/2024	Mr. Deepak Pundlik, Mr. Amit Rai, Ms. Shruti Shrivastava
2.	Cross checks between information provided by interviewed personnel (i.e. by checking sources) to ensure that no relevant information has been omitted			
3.	Interviews with randomly selected local stakeholders to check the monitoring of GS sustainable parameters like employment and training, environmental and other relevant issues.			

List of CME personnel interviewed during on-site inspection conducted from 20/02/2024 to 22/02/2024 are as follows:

Interviewed Personnel	**Functions**	**Organization**	**Subject**
Mr. Bhaskar Datta	Assistant General Manager	EKI Energy Services Limited	PoA/VPA description, VPA boundary, Technical description of HWT, Monitoring plan, baseline scenario, Technical description, Ex- ante and Ex- post parameters, fNRB value, EIA requirement, Local stakeholder consultation, safeguarding principles, SD Goals etc.
Mr. M. D. Meraj Ali	Senior Executive	EKI Energy Services Limited	
Mr. Ravi Vishwakarma	Senior Executive	EKI Energy Services Limited	
Mr. Pawan Sharma	Distributor	Aaransh Agro Tech Pvt. Ltd.	

As detailed in section 3.8 below, VVB selected 09 random samples from CME's sampling records/17/ databased for baseline study and same were interviewed. The details of baseline users interviewed are presented in the below table:

Interviewed Personnel			Date	Reason	Subject
Last Name	First Name	Survey ID number			
-	Ms. Shremati	228	20/02/2024 to 22/02/2024	Households for baseline survey	- General information - Number of people in household - Whether use untreated water or boil the same? - Baseline stove type - Baseline fuel type - Baseline water boiling time - Environmental and health issues of Baseline stove - Sources of water: steam/well/other
-	Mr. Mohanlal	18			
Dhurve	Mr. Jamsingh	01			
-	Ms. Ramkali	180			
-	Mr. Sunaram	256			
Patwari	Ms. Maravi	166			
Tekam	Mr. Mahyendra Singh	135			
Gond	Mr. Sudhin Singh	250			
Bharavi	Mr. Jodha Singh	103			

The on-site interviews were conducted with the users and following questions were asked to them.

The households who were part of baseline survey/2/ conducted by CME were asked the following questions:

1. General information of households
   a. Interviewee Name
   b. ID and its No.
   c. Age, Gender
   d. Household location
2. Water purification means used:
3. If, water is being boiled using traditional stove
   a. Are you the main user of the Cookstove at home?
   a. How many people are there in your household?
   b. What type and number of Stoves did you use? Three-stone fire, Self-built low efficient clay stove, Traditional low efficient stove or Others. If others, the type and number of stoves are

c. What kind of fuel do you use for the stove(s)? Charcoal, Firewood, or Others. If others, the kind of fuel is?
d. Do you have fuel available in the vicinity or need to go far away? If yes, how far?
e. Who collects the fuel required for boiling the water?
f. What is the source of the water used?
g. Who collects water and how much time does it take?
h. Is the source of water same during dry/wet season?
i. Where do you store collected / boiled water?
j. How many times a day you boil the water?
k. Do you face any health-related issues while boiling the water?
l. Do you face any health-related issues if you drink water without boiling?

Feedback Received through the Interview: All the interviewees provided the general information of households. All of them use stove for water boiling for subsequent consumption and are main users of the cookstoves at home. There are 2-7 people in their household. All of them uses three-stone fire stove for water boiling. The number of stoves they used are 1 (01) which is also used for cooking their meals. The fuel they used is firewood, no other fuel is used as same is not available within the area. All of them confirmed that the investigator came to their home to conduct a survey during February, and March, 2023/2/. All of them expressed that the cookstove being used generate smoke and cause respiratory or itching issues. With stove, all of them has to visit the field for collection of firewood at least 3 times a week and average collection time was 5-6 hours. All of them confirmed that their perennial water source was either stream or open well throughout the year. They confirmed that they are aware and have experienced health issues if water is directly drunk without boiling the same. They also confirmed that as of now no government scheme is launched/distributed in their villages for safe water for drinking.

2.4 Resolution of Clarification and Corrective Action requests

The objective of this phase of the validation was to resolve the requests for corrective actions and clarification and any other outstanding issues which needs to be clarified for Applus+ Certification positive conclusion on the VAP-DD/1/. The Corrective Action Requests and Clarification Requests raised by Applus+ Certification were resolved during communications between the CME and Applus+ Certification to guarantee the transparency of the validation process, the concerns raised and responses given are summarized in Appendix 1 below.

The most recent version of GS4GG VPA-DD/1/ serves as the basis for the final assessment presented.

2.5 Internal Quality Control

As a final step of design certification, the final documentation including the validation report has to undergo an internal quality control by the Technical Reviewer. Each report has to be finally approved either by the VVB's Technical Manager or the Deputy. In case one of these two persons is part of the assessment team, the approval can only be given by the person who is not a part of the assessment team. If the documents have been satisfactorily approved, the Request for Registration is submitted to the GS4GG along with the relevant documents.

Thus, a draft validation report prepared by the assessment team is reviewed by an independent technical review team (one or more members) to confirm whether all the internal procedures established and implemented by Applus+ Certification were duly complied with, and such opinion/conclusion were reached in an objective manner that complies with the applicable GS4GG rules/requirements. The technical review team is collectively required to possess the technical expertise of all the technical areas/sectoral scope the project activity relates to. All team members of the technical review team are independent of the validation team. Details of the Technical Reviewer(s) are provided within this report in appendix 2 for further references of knowledge and capability to conduct the quality checking.

During the technical review process, additional findings may be identified or the closed-out findings may be opened, which needs to be satisfactorily resolved before the request for issuance is submitted. The independent technical reviewer may either approve the report as such or reject/return the same in such case providing the comments/findings/issues that needs to be resolved by the verification team.

After the Technical Review process, the final documentation may undergo a final quality checking process called Administrative Review, done by the Applus+ Certification's Project Manager and/or Technical Support.

For final approval, the final set of documents are prepared by the VVB's Technical Manager or its deputy and signed by the authorized signatory of the VVB. The decision taken by the Technical Reviewer is final and is authorized by the authorized approver of Applus+ Certification.

3. PROJECT DESIGN CERTIFICATION ASSESSMENT

3.1 Approval

The VPA is undergoing design certification for inclusion under a PoA i. e. GS12219 'Global Household Water Treatment Technology Dissemination Project'. The VPA has a start date as 11/05/2023[/6/]. The stakeholder meeting for this VPA was conducted on 10/05/2023[/21/]. The stakeholder feedback round was held between 01/06/2023 to 01/07/2023. The initial documents for PoA and VPA were submitted for validation in January, 2024. VVB has checked and confirmed that there is a continual action and no delay is observed.

3.2 Participation

EKI Energy Services Limited is the CME from the host country India. The host country involved is party to the Kyoto Protocol and meet and requirements to participate in the Gold Standard.

3.3 Scale of the project

The project activity is identified as micro-scale project because it fits in the micro-scale threshold as defined by the Community Services Activity Requirements version 1.2 and GHG Emissions Reduction & Sequestration Product Requirements version 2.1[/5/] para 3.1.2 in which micro scale is related to "CSA Project issuing emission reductions less than or equal to 10,000 tCO_2eq per annum".

CME is expected to distribute about 2,000 HWT water purifiers and expected emission reductions are 5,745 tCO_2e per annum. The detailed calculation presented the ER spreadsheet – 'Emission

Reduction[3] was checked by VVB and confirmed that the VPA's expected emission reductions are 5,745 tCO_2e per year.

3.4 Greenhouse Gases

The VPA is an "End-use energy efficiency" project which reduces fuel consumption during the water boiling activities and thus reducing greenhouse gas emission and contributing to climate change mitigation in line with the UN's Sustainable Development Goals, the project is foreseen to provide several SDG benefits for the local families and communities. Hence, the greenhouse gas identified in the GS4GG VPA-DD[1] is Carbon Di-oxide which is duly validated by the VVB.

The GHG emission sources considered for the project boundary and their explanations are as follows:

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Emission from wood fuels utilized for obtaining safe drinking water displaced due to project activity.	CO_2	Yes	Important source of emissions as CO_2 is emitted any time biomass or fossil fuels are burned.
		CH_4	No	Not considered as per the methodology. Exclusion is conservative assumption.
		N_2O	No	Not considered as per the methodology. Exclusion is conservative assumption.
Project scenario	Emissions from electricity/fossil fuels for operating project water supply/treatment technology	CO_2	Yes	Important source of emissions as CO_2 is emitted any time biomass or fossil fuels are burned.
		CH_4	No	Not considered as per the methodology. Exclusion is conservative assumption.

		N_2O	No	Not considered as per the methodology. Exclusion is conservative assumption.

3.5 Project timeframe

Other certification scheme: The VPA has not applied, confirmed by CME, for any other certifications. Therefore, the validation team concluded that VPA meets the applicability criteria of Gold Standard. Assessment team checked the double counting declaration by CME/16/ dated 21/03/2024 and has checked other carbon registries such as VERRA, CDM, GCC etc to confirm that the current VPA is not applied/registered with any of the same. The VPA has applied for GSVER regular validation. CME has provided undertaking/16/, that they will avoid double counting and not intended to seeking registration under other GHG schemes for current VPA too.

3.6 Project Boundary

As per paragraph 3.1.1 of the applied methodology/4/, the project boundary includes:
a. the physical, geographical sites of the low- or zero-greenhouse gas emitting technologies to treat/supply safe drinking water installed by the VPA,
b. any back-up engines or other equipment using fossil-fuel related to the low greenhouse gas emitting technologies,
c. the electricity grid, in the case electricity is used by the project, and
d. the household, commercial and institutional buildings where the end users of safe water provided by the project are located.

The current VPA involves distribution of HWT in form of water purifier which are cartridge based thus not requiring any fuel including electricity to run the same. These water purifiers are distributed to the households within Dindori and Anuppur districts of Madhya Pradesh. This is clearly demonstrated in the VPA-DD/1/, confirmed during on-site visit and found to be appropriate as per the requirements of methodology and hence accepted.

3.7 Baseline Identification

The description of baseline scenario has now been updated under section B.4 of revised VPA-DD in-line with para 3.5.1 (a) and (b) of applied methodology "Methodology for Emission Reductions from Safe Drinking Water Supply" v1.0[5] (published by dt.03/05/2021), including both options of baseline scenario that, the users would have boiled water for drinking in the absence of the project activity or drink unsafe water (suppressed demand). With reference to the GHG EMISSIONS REDUCTION & SEQUESTRATION PRODUCT REQUIREMENTS v2.4, para 9.1.2 (c) which mentioned "*project involves technologies such Safe Water Supply, Waste management, etc. not included in Type I or Type II that result in GHG emission reductions not exceeding 60,000-ton CO2e per year in any year of the crediting period*". As the annual emission reduction

[5] https://globalgoals.goldstandard.org/standards/429_V1.0_EE_SWS_Emission-reductions-from-Safe-Drinking-Water-Supply.pdf

resulting from the VPA is 5,745 CO_2e, thus, suppressed demand can be applied for the project activity., project falls under micro-scale project activity. Thus, second option (end users drink unsafe water – suppressed demand) for demonstrating baseline scenario has been used under current project activity.

The VVB checked the applied methodology which in section 3.5.1 (a) mentions for suppressed demand - Document the drinking water sources and/or treatment technologies available and used in the project boundary. VVB noted that CME has conducted a baseline study which has documented the drinking water sources and/or treatment technologies.

The CME conducted separate baseline study in the project area which is based on the principles of suppressed demand such as documenting (a) pre-project drinking sources available in the area, (b) documenting baseline technologies used for treating water and (c) type of fuels used for the treatment.

As both the pre-project scenarios are present in project boundary i.e boiling water on traditional stove and drinking unsafe /hazardous water (suppressed demand), CME has conducted baseline survey by dated from 28/02/2023 to 04/03/2023 in Dindori and Anuppur District of host country India. VVB has checked the survey records and confirm the following:
a. The main source of drinking water for majority of survey population (67.78%) is open dug-well in dry season.

b. 94.07% (254 households) rely on unimproved water sources like Water from Spring (Unprotected well), Dug well (Unprotected well) and Surface water (river, stream, dam, lake, pond, canal, irrigation channel)
b. i. Of these, 39.76% (101 households) boil their water for consumption.
b. ii. The remaining 60.24% (153 households) do not treat their water but would do so if they had the resources

c. 5.93% (16 households) have access to improved water sources, but all of them reported quality issues (unacceptable taste, unacceptable smell, unacceptable colour, or contains materials)
c. i. 31.25% (5 households) from this group boil their water
c. ii. o The remaining 68.75% (11 households) would treat their water if they had the resources

VVB has checked the submitted copy of baseline study and has cross checked the identified baseline which is mentioned in the above paragraph through on-site interviews with the stakeholders.

Then-after it was also concluded that 55.19 % of sample population treated (by different sources like strain through cloth but mostly by using traditional water boiling three-stone cookstove) water for drinking & cooking purpose and rest are consuming un-treated water, which means that significant number of population is still consuming untreated water source. Finally, it was noted that, only 39.26 % population is using boiling method to treat the water and major of the population in project area are still consuming un-treated water due to energy poverty (not enough fuel to boil water), lack of time, lack of awareness to treat water. Therefore, as per applied methodology CME able to provide evidence-based justification that, majority of population have less than the minimum required amount of safe drinking water available in project boundary.

VVB has verified the conducted baseline study and questionnaire & cross checked during the onsite visit & interviews and found justification provided by project developer is acceptable. Additionally, it was also noted that conducted baseline survey in-line with national safe drinking water requirements (https://law.resource.org/pub/in/bis/S06/is.10500.2012.pdf).

In the PDD, PD has provided cross checked conducted to establish baseline scenario with the various studies in the host country/within the state of Madhya Pradesh/within the Dindori district. The same were checked and assessment is presented below:

- A study in water policy journal - Determinants of access to improved drinking water and sanitation in India: evidence from India Human Development Survey-II (IHDS) (2023)[6] mentions that 91 million people in the host country – India still do not have access to clean drinking water.
- As per a report by Centre for Affordable Water and Sanitation Technology (CAWST)[7], found that India has the highest rate of water-borne illness deaths in the world, despite having high access to improved water sources. The report has established that sources such as untreated tap water, hand pumps, and bore/tube wells are all included in the definition of improved water sources but can be easily contaminated during water collection and distribution.
- A study conducted by Central Pollution Control Board of India (CPCB[8]) in year 2022 has revealed that even water from improved sources in different parts of India often contains high levels of E. coli contamination. This study has considered simples from Madhya Pradesh state also which shows presence of faecal coliform/total coliform in the sampled wate in the state.
- A research paper published in Groundwater for Sustainable Development "Physico-chemical analysis of groundwater during monsoon and winter season of Dindori district, India"[9] from February, 2021 issue mentions, 57% of total samples exhibited slightly higher values of one or more parameters (including Biological Oxygen Demand - BOD) than the desirable limit, i.e., amount up to that a particular parameter can be present in drinking water. Higher BOD means more presence of bacteria in the sampled water. The process of water filtration for these water sources may be adopted for getting drinking water. This water is, therefore, not suitable for drinking and domestic purposes.
- WaterAid has conducted "Assessment of the status, service delivery infrastructure and governance of drinking water supply in small and medium towns" in Dindori town in year 20202[10]. This study was for households with access to piped water supply (PWS), and households using all other types of water sources (public hand pumps, standposts). The study concluded that, in Dindori, water quality tests from different sources revealed that 92.5% simples were bacteriologically contaminated with above acceptable limits. The major bacteriological contaminants were total coliform, faecal coliform and E. coli.

- A newspaper article from August, 2024 mentions that the highest number of patients with diarrhoea were found in Dindori district and five of them died. The conducted tests confirmed that water contamination was the reason and main source of water is borewell.

6 https://iwaponline.com/wp/article/25/10/980/97931/Determinants-of-access-to-improved-drinking-water
[7] https://www.engineeringforchange.org/research/household-water-treatment-trends-india/
[8] NWMP_DATA_2022.pdf
[9] https://www.sciencedirect.com/science/article/abs/pii/S2352801X21000060
[10] https://www.wateraid.org/in/sites/g/files/jkxoof336/files/town-report-dindori-madhya-pradesh.pdf

The above 3rd party study has confirmed that the baseline scenario and parameters selected are appropriate.

Baseline fuels and efficiency of baseline stoves:

In the most recent version of PDD, CME has now provided cross checking of baseline survey with 3rd party sources. The cross checking provided is found sufficient and hence no further checks are conducted by VVB.

The baseline survey and VVB visit and interviews have confirmed baseline fuel as firewood and three stone fired cookstove as the baseline stove. The most recent study by Council on Energy, Environment and Water (CEEW)[11] titled – "State of Clean Cooking Energy Access in India" mentions that rural areas in Madhya Pradesh reply on firewood as the fuel for their daily needs though Liquified Petroleum Gas (LPG) is being promoted through government for clean cooking. The reasons for non-use of LPG on larger scale by rural population as noted in the report are; preference for food cooked on the chulha (three stone stove), lack of adequate documents to procure an LPG connection, poor LPG availability in their locality, and easy availability of biomass. The reports speaks about staking of LPG with solid fuels (biomass in this case) as LPG use requires recurring expenses and most of rural areas do not get doorstep delivery leading to higher expenses for refilling.

Based on the above study and review of National Family Health Survey 2019-21 (NFHS-5)[12], CME has decided xf for LPG as 2.6% with LPG users at 5.94% as per CEEW report. This information is found conservative and is accepted.

The validation team based on desk review, on-site visit & interviews confirmed from the households/CME that in the baseline scenario under current VPA (micro-scale), majority of population consuming un-treated water for drinking. Thus, CME has applied principles of suppress demand as the VPA is of micro-scale as assessed and confirmed above in section 3.3.

Findings: CAR 04 was raised and closed successfully.

3.8 Implementation of sampling plan

During the physical on-site visit, a random acceptance sampling approach has been used by the validation team to validate the information as listed in the VAP-DD which are determined through sample baseline survey by CME.

For sampling, VVB has referred applicable paragraphs from "Guideline for Sampling and surveys for CDM project activities and programmes of activities", version 03.0/4/ and Standard for "Sampling and surveys for CDM project activities and programmes of activities" version 09.0/4/.

[11] ires-report-on-state-of-clean-cooking-energy-access-in-india.pdf
[12] NFHS-5_Phase-II_0.pdf

In line with Guideline for Sampling and surveys for CDM project activities and programmes of activities, version 03.0 appendix 5, VVB has used acceptance sampling, as described in the "Standard for sampling and surveys for CDM project activities and programme of activities", in the validation process to validate that the CME has implemented a sampling plan to a satisfactory standard.

In line with the Standard for "Sampling and surveys for CDM project activities and programmes of activities" version 09.0[/5/], Paragraph 26, the VVB has applied a sampling as part of the validation process.

As the CME has applied sampling approach, the VVB has chosen acceptance sampling in accordance with paragraph 28 of the same standard.

As per para 39 of "Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 9.0, *"A DOE may select a different sample size than the one indicated in paragraph 32, either by choosing a different value for the consumer risk and producer risk (e.g. 20% for the consumer risk) when applying acceptance sampling or by using another approach, if any of the following conditions apply:*

The estimated volume of annual emission reductions of the project activity or the PoA being verified is equal to or less than 100,000 tCO_2e.
The security conditions in the project region prevents inspection of many samples (e.g., conflict zones); or
The project activity or the PoA is in a least developed country or a host Party with 10 or fewer registered CDM project activities at the end of the monitoring period being verified."

In case of the current validation assessment, the estimated volume of annual emission reductions of the VPA is under registration is less than 100,000 tCO_2e (i.e. 5,745 tCO_2e) thus meeting the requirement of para 39(a) CDM "Standard for Sampling and surveys for CDM) of project activities and programmes of activities, Version 9.0[/7/]. Hence VVB has considered 9 samples for the physical inspection.

The validation team determined the sample size for acceptance sampling by evaluating the following, using its own professional judgement and guidance in the CDM Standard 'Sampling and surveys for CDM project activities and programme of activities'[/5/].

The proportion of discrepancies between the CME's data and validation team's (onsite inspection) data that can be considered acceptable. This is referred to as the AQL (Acceptable Quality Level): 0.5% was considered in this validation which is in line with the para 29 (b) of the CDM "Standard for Sampling and surveys for CDM) of project activities and programmes of activities, Version 9.0[/5/].
The proportion of discrepancies between the CME's data and validation team's (onsite inspection) data that would be considered unacceptable. This is the UQL (Unacceptable Quality Level): 20% was considered in this validation.
The producer risk of 5% and consumer risk of 15% was considered.

This is as per the table 2 of the CDM "Standard for Sampling and surveys for CDM) of project activities and programmes of activities, Version 9.0 /5/.

Table 2. Sample size and acceptance number based on AQL, UQL, and producer and consumer risks

Producer risk		5%		5%		5%		5%	
Consumer risk		5%		10%		15%		20%	
AQL	UQL	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)
0.5%	10%	46	1	38	1	33	1	29	1
0.5%	15%	30	1	25	1	22	1	10	0
0.5%	20%	22	1	18	1	9	0	8	0
1.0%	10%	61	2	52	2	33	1	29	1
1.0%	15%	30	1	25	1	22	1	19	1
1.0%	20%	22	1	18	1	16	1	14	1
Producer risk		10%		10%		10%		10%	
Consumer risk		5%		10%		15%		20%	
AQL	UQL	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)	Sample size (n)	Acceptance number (c)
0.5%	10%	46	1	38	1	19	0	16	0
0.5%	15%	19	0	15	0	12	0	10	0
0.5%	20%	14	0	11	0	9	0	8	0
1.0%	10%	46	1	38	1	33	1	29	1
1.0%	15%	30	1	25	1	22	1	10	0
1.0%	20%	22	1	18	1	9	0	8	0

Considering the above input values, a sample size of 9 was required as per above table. The assessment team has picked up random 9 samples with the help of ER calculation excel sheet/3/.

The VVB checked only 9 available samples during the on-site inspection. All the households had same answer as reported in the survey sheet. thus, no discrepancy was observed. Accordingly, Acceptance number (c) thus determined for the sample size is 0 and a sample size of 9 meets the criteria in line with "Standard for Sampling and surveys for CDM project activities and programmes of activities, Version 9.0,"/5/.

Using acceptance sampling approach, validation team checked the CME's samples results along with the following evidences:

- CME baseline database
- On-site interviews
- Project technology specific material

The result of the survey is given below:

Parameters	VVB Sample size	No of CME's record beyond unacceptable level	Accepted
Monitoring parameters as per the VPA-DD	9	0	9

3.9 Eligibility Principles Assessment

The VPA is eligible to apply the "Community Services Activity Requirements" version 1.2 since it meets the criteria as outlined in sections "Eligible Project Types" and "General Eligibility Criteria" of those "Community Services Activity Requirements" /8/. The details are discussed in the section below.

Applicability of GS4GG Principles and Requirement, version 1.2

Eligibility Criteria	VVB assessment
3.1.1 (a) Types of Project: Eligible projects shall include physical action/implementation on the ground. Pre- identified eligible project types are identified in the Eligibility Principles and Requirements section.	The current VPA is distribution of HWT for safe drinking water thus qualifies eligibility under 3.1.1 (d) of Community Services Activity Requirements, version 1.2/4/. The program includes water filter distribution implementation on the ground thus satisfies the criterion.
3.1.1 (b) Location of Project: Projects may be located in the entire India.	The real case VPA is located within two districts of Madhya Pradesh state i. e. Dindori and Anuppur as confirmed by the VVB against the KML file submitted for the VPA/10/ which was found to be consistent with the on-site visit. Hence, this criterion is satisfied.
3.1.1 (c) Project Area, Project Boundary and Scale: The Project Area and Project Boundary shall be defined. Projects may be developed at any scale although certain rules, requirements and limitations may apply under specific Activity Requirements, Impact Quantification Methodologies and Products Requirements. In order to avoid double counting the Project shall not be included in any other voluntary or compliance standards programme unless approved by Gold Standard (for example through dual certification). Also, if the Project	The Project Boundary and the project area of the VPA has been checked by VVB against the submitted KML file/10/ and as confirmed by CME representative, it will be India as a whole country. The current VPA has total emission reductions are 5,745 tCO_2e which is less than 10,000 tCO_2e thus, the VPA qualifies for micro scale as per GS4GG guidelines, calculations of which has been clearly reflected in the Ex-ante ER calculation sheet/3/. CME has given a declaration/16/ that current VPA which is being included in current PoA is not included in any other PoA or registered as a stand-alone project or is/are not registered by other carbon compliance standards / programs and/or country specific registries. VVB has checked the

Area overlaps with that of another Gold Standard or other voluntary or compliance standard programme of a similar nature, the project shall demonstrate that there is no double counting of impacts at design and performance certification (for example use of similar technology or practices through which the potential arises for double counting or misestimation of impacts amongst projects).	other carbon registries such as VERRA, CDM, GCC and others to confirm that the current VPA is not part of any carbon compliance standard/programs. Further, as evident during the on-site visit/interviews with CME representative, CME has ensured that each HWT distributed has a unique serial number and project database/20/ has recorded user location details to avoid double counting. Hence, this criterion is satisfied.
3.1.1 (d) Host Country Requirements: Projects shall be in compliance with applicable Host Country's legal, environmental, ecological and social regulations.	VVB has checked and confirmed that there are no specific host country (India) requirements as evident from websites of MoEF&CC[13] (Ministry of Environment & Forest & Climate Change) & MNRE[14] (Ministry of New & Renewable Energy), Ministry of Jal Shakti [15] for water distribution programme. VVB noted that government of India has not notified any laws/regulations/orders for such project/programme's implementation in recent years. Hence, this criterion is satisfied.
3.1.1 (e) Contact Details: As part of the Project Documentation the Project Developer shall provide (i) name and (ii) contact details of all Project Participants; AND in case of an organization (iii) the legal registration details and (iv) documentation by the governing jurisdiction that proves that the entity is in good standing (defined as being a legal or other appropriate entity registered in or allowed to operate within the required jurisdiction and with no evidence of insolvency or legal/criminal notices placed against it or any of its Directors). Gold Standard retains the right (at its own discretion) to refuse use	Name and contact details of the CME have been provided in appendix 2 of the submitted final version of VPA-DD/1/, which is found to be in accordance with the organization's registration certificate/23/ and acceptable. The details of Local partner organizations and staff involved in the implementation of VPA was checked during on-site visit to confirm that CME is acting as VPA implement. The CME has provided the company registration certificate/23/ and found to be satisfactory. also, there is no evidence of insolvency or legal/criminal notices placed against it or any of its directors, same has been confirmed by VVB via host country's official weblink[16] and was found to

[13] https://moef.gov.in/moef/index.html
[14] https://mnre.gov.in/
[15] Department of Water Resources, River Development and Ganga Rejuvenation | India (jalshakti-dowr.gov.in)
[16] https://www.mca.gov.in

of the Standard where reputational concerns are highlighted.	be consistent as stated by the CME personnel during the on-site inspection. Hence, this criterion is satisfied.
3.1.1 (f) Legal Ownership: Full and uncontested legal ownership of any Products that are generated under Gold Standard Certification, (for example carbon credits) shall be demonstrated. Where such ownership is transferred from project beneficiaries this must be demonstrated transparently and with full, prior and informed consent (FLIC). Note that for certain Project types there is a requirement for full and uncontested legal land title/tenure to be demonstrated. These are contained within specific Activity or Product Requirements. All projects shall immediately report to Gold Standard any land title/tenure disputes arising.	The legal ownership of real case VPA is with CME as confirmed based on end user agreement and hence accepted. The end user agreement/6/ clearly demonstrated FPIC and same was cross checked during on-site visit as the current VPA is undergoing joint validation and verification.
3.1.1 (g) Other Rights: As well as legal title and ownership, the Project Developer shall also demonstrate where required uncontested legal rights and/or permissions concerning changes in use of other resources required to service the Project (for example, access rights, water rights etc.). Any known disputes or contested rights must be declared immediately to Gold Standard by the Project Developer and resolved prior to further Project implementation in affected areas.	The current VPA distributes HWT in form of water purifiers. This does not involve any legal rights and/or permissions concerning change of other resources. Hence this criterion is satisfied.
3.1.1 (h) Official Development Assistance (ODA) Declaration: All Project Developers applying for project activities located in a country named by the OECD Development Assistance Committee's ODA recipient list and seeking Gold Standard Certification for carbon	The assessment team has verified the ODA declaration provided by CME/15/ to confirm that the current VPA programme does not involve ODA funding. Hence, this criterion is satisfied.

credits shall declare the Official Development Assistance (ODA) support. The Project Developer shall follow the GHG Emissions Reduction & Sequestration Product Requirements and submit the declaration at the time of Design Certification.	

Applus+ Certification confirms that the application of the baseline methodology is transparent and conservative and confirms that the chosen baseline and monitoring methodology i. e. Methodology For Emission Reductions From Safe Drinking Water Supply, version 1.0 along with the tools applied is applicable to the VPA. The assessment of the application of methodology and tools is presented below:

Applicability of Tool 30 - Calculation of the fraction of non-renewable biomass, version 04.0.

VVB has confirmed that CME has demonstrated in line with tool 30, version 4.0/4/ that Non-renewable biomass has been used in the project region since 31/12/1989. Hence, CME has used the tool to calculate value of f_{NRB} in line with para 6 (b) of the tool. The assessment of the same is provided in appendix 3 below.

Principle 2: Safeguarding Principles

The Safeguarding principles assessment is as below:

a. **Principle 1. Human rights:**

The VPA involves the distribution of water purifiers. To live in a clean and healthy environment is the fundamental right conferred to all citizens. CME has implemented the VPA respecting internationally proclaimed human rights and is no complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights[17]. During on-site visit, VVB confirmed that the VPA does not either discriminate with regards to participation and inclusion as the safe water technology equipments are distributed for the families selected in collaboration with the representatives of the local communities.

b. Principle 2. Gender Equality and Women's Rights

CME has taken steps to ensure that the VPA will observe gender equality. As confirmed during on-site visit, CME will carry out awareness meetings and records of the same will be available for cross-checking.

As confirmed during on-site visit, the VPA directly benefits to women and women's rights. Water collection and its storage, boiling as required is primarily managed by women in these localities. By implementing the VPA, women will need reduce time required for water boiling and less fuel collection. Thereby, work burden will be reduced. Thus, with VPA implementation it leads to safer and cleaner environment. This was cross checked during on-site interviews with end users. In summary, the VPA takes care of gender equality and women rights.

[17] https://www.un.org/en/about-us/universal-declaration-of-human-rights

c. Principle 3. Community Health, Safety and Working Conditions

The VPA does not involve any hazardous material during construction and operation of distributed water purifiers leading to cleaner environment as compared with baseline conventional stoves. Hence, the VPA leads to safe working conditions and improved in health of end users.

d. Principle 4 – Cultural Heritage, Indigenous Peoples, Displacement and Resettlement:

The VPA is implemented in existing households where the inefficient conventional cooking stoves are being replaced with water purifiers. This does not involve any damage to cultural heritage or displacement and resettlement and rights of indigenous people. The VPA takes place in households. Hence, this parameter is safeguarded.

e. Principle 5 – Corruption:

The VPA involves distribution of safe drinking water project technology in rural households which does not require any specific permit or approval from any authority. Therefore, the VPA does not have any scope for corruption or corrupt practice. The principle is safeguarded.

f. Principle 6: Labour rights & negative economic consequences:

The VPA operation is not labour intensive as it doesn't involve major construction works, employing labours is not within the scope of the VPA. CME trains the local people to contribute towards PoA objective to avail safe drinking water availability at the households such that the trained persons are capable of developing entrepreneurial skills to handle the supply chain. Therefore, the safeguarding principle under discussion will not have negative impact.

The host country has ratified ILO Convention 87 and 98[18] and the employment carried out by CME for the PoA/VPA implementation is in compliance with the same.

g. Principle 7 – Climate and Energy:

The VPA being implementation of water purifiers saves energy as compared to baseline scenario which leads to overall emission reductions. The energy supply is not hampered compared to baseline but improved.

h. Principle 8 – Water:

The VPA involves use of safe drinking water technology through HWT which needs water but it is being used for daily consumption and has no impact on environment for its operation. Therefore, the project does not have any impact on water.

i. Principle 9 – Environment, ecology and land use:

[18] https://so06.tci-thaijo.org

The VPA involves use of safe drinking water technology through HWT which does not involve any landscape modification or leads to vulnerable natural disasters. It also does not involve any manufacture, trade, release, and/ or use of hazardous chemicals and/or materials. It leads to less pollution (avoiding air pollution due to firing of fuel wood) compared to baseline scenario. Hence, the principle is safeguarded.

Principle 3: Stakeholder Inclusivity

As per the GS4GG requirements/4/, it is necessary to invite the relevant stakeholders, before the validation process starts. For developing GS VPA, stakeholder meeting was held on 10/05/2023/21/. All the stakeholders were invited through individual invitations via e-mail, letter or telephone and public invitations made via posters/22/.

The stakeholders identified by the CME were representatives of government authorities at national and local levels, private, technical and administrative entities and from local and international non-governmental organizations as well as to Gold Standard and to the relevant Gold Standard NGO supporters. Validation team validated the list of participants/22/ who attended the stakeholder meeting and feedback questionnaire and confirms the stakeholders identified were relevant. The validation team also validated the minutes of meeting to note that no negative comments were received and the same was cross checked with the information obtained during follow up interviews with the stakeholders. The stakeholder consultation report submitted to GS4GG was also cross checked to confirm the consultation process and outcome.

Thus, validation team is of the opinion that the stakeholder meeting was adequate and appropriate.

Following observations are made by the VVB:

- Different representative of stakeholders like representatives of government authorities at national and local levels, private, technical, and administrative entities and from local and international non-governmental organizations were invited for their comments via emails during stakeholder's feedback round.
- No negative comments were received, and local stakeholders were very satisfied with the project activity implementation and operation in their area.

FAR 01 was raised as a part of preliminary review for inclusion of category E stakeholder which was confirmed through an e-mail submitted by CME. This screenshot of the mail/8/ confirmed that category E stakeholders were invited for SFR round hence this FAR is closed.

Principle 4: Demonstration of real SDG outcomes

The distribution of Safe drinking water technology through HWT will have positive contribution to SDGs 1, 3 and 13. The SDG goals are also described below:

SDG no.	SDG Target	SDG Indicator	Project specific indicator
SDG 1 – No poverty	By 2030, ensure that all men and women, in particular the poor and the vulnerable, have	Proportion of population living in households with	Net Benefit (SDG 1) = $\mathbf{N_{p,y}}$ Where:

	equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	access to basic services.	$N_{p,y}$ = Access to basic services (Accumulated number of premises type p with at least one individual project technology in year y)
SDG 3 – Good health and well being	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	Mortality rate attributed to household and ambient air pollution	Net Benefit (SDG 3) = **$SPM_{HH,Project}$** Where: $SPM_{HH,Project}$ = % HH reporting reduction in smoke/PM emissions after they start using the water filter in project scenario
SDG 4 – Quality education	By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university	Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex	Net Benefit (SDG 4) = $AP_{Project}$ - $AP_{Baseline}$ Where: $AP_{Baseline}$ =Number of Awareness program/training for using baseline = 0 $AP_{Project}$ =Number of Awareness program/training for using project scenario = 100%
SDG 5 – Gender equality	Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age, and location	Net Benefit (SDG 5) = $HHT_{Project}$ - $HHT_{Baseline}$ Where: $HHT_{Baseline}$ = % HH reporting time saving due to reduced collected fuel consumption/water boiling time in baseline scenario = 0 $HHT_{Project}$ = % HH reporting time saving due

			to reduction in time saving to collect fuel wood/ water boiling time in project scenario = 100%
SDG 6 – Clean water and sanitation	By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1.1: Percentage of population have access to improved source of water	Net Benefit (SDG 6) = $\mathbf{N_{p,y}}$ Where: $N_{p,y}$ = Access to basic services (Accumulated number of premises type p with at least one individual project technology in year y)
SDG 7 – Affordable and clean energy	By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.2 Proportion of population with primary reliance on clean fuels and technology.	Net Benefit (SDG 7) = $N_{p,y}$ Where: $N_{p,y}$ = Access to basic services (Accumulated number of premises type p with at least one individual project technology in year y
SDG 8 – Decent work and economic growth	By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	Average hourly earnings of employees, by sex, age, occupation and persons with disabilities	Net Benefit (SDG 8) = QE $IG_{Project}$ Where: QE $IG_{Project}$ = Quantitative Employment and income generation (Number of persons (male and female) hired under Project scenario)
SDG 12 – Responsible consumption and production	By 2030, achieve the sustainable management and efficient use of natural resources	Indicator 12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Net Benefit (SDG 12) = $[Q_y*(360.83/n_{wb})*Xf_{wood}/15.6*10^3*(1-f_{NRB,f,y})$ N_{wb}= Efficiency of used cookstove in the baseline scenario Qy= Quantity of safe drinking water provided by the project.

			$f_{NRB,f,y}$= Fraction of non-renewable bio-mass. $15.6*10^3$= NCV of wood in KJ/Kg
SDG 13 – Climate action	Integrate climate change measures into national policies, strategies and planning	Indicator: 13.2.2 Amount of CO2e emissions reduced by the project per year	Net Benefit (SDG 13) = $BEy = EFb \times (1 - Cb - X_{cleanboil},) \times Qy \times Mq,$ Where: B = Baseline emissions E from the use of fuel to y obtain safe water in the baseline (tCO_2e) E = Emission factor for F the use of fuel to b obtain safe water in the baseline (tCO_2e/L) C = Proportion of project b end-users who in the baseline were already using a safe water supply that did not require boiling (%) X = Proportion of project cl end-users that boil safe eawater in the project n year y (%) bo $il,$ y Q = Quantity of safe y drinking water provided by the project in year y (L) M = Modifier for the $q,$ water quality in y year y
SDG 15 – Life on Land	By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase	Indicator 15.2.1: Progress towards sustainable forest management. Project-specific Indicator:	Net Benefit (SDG 15) = $[Q_y * (360.83 /N_{wb})*X_{f,wood}/15.6*10^3]* f_{NRB,f,y}$ Where,

	afforestation and reforestation globally	Reduction in consumption of non-renewable biomass.	N_{wb}= Efficiency of used cookstove in the baseline scenario Q_y = Quantity of safe drinking water provided by the project. $f_{NRB,f,y}$ = Fraction of non-renewable bio-mass. $15.6*10^3$= NCV of wood in KJ/Kg

Principle 5: Financial Additionality & Ongoing Financial Need

As per the applied methodology/5/ "Methodology for Emission Reductions from Safe Drinking Water Supply" v1.0, Paragraph 3.3.2 (a), additionality can be demonstrated based on the applicable GS4GG Activity Requirement. Thus, GS4GG Community Services Activity Requirements/6/ Version 1.2, Paragraph 4.1.9 specifies that projects that meet any of the following criteria are deemed additional:

(a) Positive list (Annex B of Community Service Activity Requirements)

(b) Projects located in LDC, SIDS, LLDC

(c) Microscale projects

There are two options available for demonstrating additionality of project activity, as CME has chosen option a, positive list of technologies or deemed additionality criteria as per applicable activity requirements.

Further, para 1.1.3 of Annex B of Community Service Activity Requirement specifies that project activity composed of isolated units where the users of the technology/ measure are households or communities or institutions and where each unit results in ⩽600 MWh of energy savings per year or ⩽600 tonnes of emission reductions per year. Hence, VPA under the current Project activity comprised with isolated units. Each Water Filter unit of the Project results in about 2.92 tonnes of emission reductions per year which is less than 600 tonnes per year mentioned in Annexure B of Community Service Activity Requirements Version 1.2, Paragraph 1.1.3. Criteria (a), therefore applied approach by CME found acceptable to VVB and which is also cross checked from estimated ER spreadsheet/3/. Hence this VPA is deemed additional which is accepted.

Also, VVB noted current VPA is not undergoing for design certification renewal, Therefore, ongoing financial need found to be "Not applicable

Findings: CL 01, 02, 03, 04, 05 and CAR 01, 03, 05, 06, 07, FAR 01 were raised and closed successfully. Refer Appendix 1 for more information.

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3.10 Calculation algorithm and/or formula used to determine emission reductions

Methodology For Emission Reductions from Safe Drinking Water Supply, version 1.0/4/ is used for the proposed project activity. As the GS4GG recommends the application of the latest version of the applied methodology along with the conservative argument of the approach followed.

The formula used in the GS4GG VPA-DD/1/ for emission reduction calculation is as per paragraph 3.9.1 of the applied methodology and was used for the calculation of emission reduction and same is found to be correct. Hence emission reduction calculation at this time of validation is conservative and appropriate.

Assessment team checked that Formula used to calculate the net emission reduction for the project activity which is as follows:

As per para 3.9 Equation 11 of the methodology,

$ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year y (tCO_2e/yr)
BE_y = Baseline emissions in year y (tCO_2e/yr)
PE_y = Project emissions in year y ($tCO2e/yr$)
LE_y = Leakage emissions in year y ($tCO2e/yr$)

As per paragraph 3.6.3 Equation 3 of the applied methodology, baseline emissions is calculated as follows:

$$BE_y = EF_b \times (1 - C_b - X_{cleanboil,}) \times Q_y \times M_{q,}$$

Where:

BE_y = Baseline emissions from the use of fuel to obtain safe water in the baseline (tCO_2e)

EF_b = Emission factor for the use of fuel to obtain safe water in the baseline (tCO_2e/L)

C_b = Proportion of project end-users who in the baseline were already using a safe water supply that did not require boiling (%)

$X_{cleanboil,y}$ = Proportion of project end-users that boil safe water in the project year y (%)

Q_y = Quantity of safe drinking water provided by the project in year y (L)

M_q,y = Modifier for the water quality in year y

Paragraph 3.6.4 of the applied methodology states that, *'the quantity of safe drinking water provided by the project is calculated using one of two methods. Method 1 applies to CWT and CWS, and Method 2 applies to HWT and IWT'*. VVB has checked and confirmed that the current VPA provides safe drinking water using method 2 through HWT. Hence, application of equation 6 as per paragraph 3.6.7 of the same is found appropriate which is as below:

$$Q_y = \sum_p N_{p,y} \times U_{p.y} \times QPW_{hh,p,y} \times DP_{p,y}$$

Where:

$N_{p,y}$ = Number of premises type *p* with at least one project technology in year *y*

$U_{p,y}$ = Usage rate of the project technology by premises type *p* during year *y* (%)

$QPW_{hh,p,y}$ = Volume of drinking water per premises *p* per day in year *y* (L/day)

$DP_{p,y}$ = Days the project technology is present for end-users in the premises *p* in year *y*

For, $QPW_{hh,p,y}$, CME has decided to apply default value as per the applied methodology i. e. 5.5 litres per person per day which is acceptable as per the Option 1 considered for the parameter SDWS 24 from the applied methodology. No. Of premises and usage rate will be defined/measured based on the monitoring survey to be conducted during the VPA verification which is acceptable.

Paragraph 3.6.1 of the applied methodology through equation 1 provides an equation for calculation of baseline emission factor which is

$$EF_b = SE_{w,b,y} \times \sum_f x_f \times \left(EF_{b,f,co2} \times f_{NRB,f,y} + EF_{b,f,nonco2}\right) \div 10^9$$

Where:

EF_b = Emission factor for the use of fuel to obtain safe water in the baseline (tCO_2e/L)

$SE_{w,b,y}$ = Specific energy required to boil water (kJ/L), to be calculated as per the paragraph below

x_f = Proportion of fuel *f* used in the baseline (fraction determined based on an energy basis)

$EF_{b,f,CO2}$ = CO_2 emission factor from use of fuel *f* (tCO_2/TJ)

$EF_{b,f,nonCO2}$ = Non-CO_2 emission factor arising from use of fuel *f*, when the baseline fuel *f* is biomass or charcoal (tCO_2e/TJ). This parameter is omitted when *f* is a fossil fuel.

$f_{NRB,f,y}$ = Fractional non-renewability status of woody biomass fuel during year *y* (fraction). For biomass, it is the fraction of woody biomass that can be

established as non-renewable. This parameter is omitted when *f* is a fossil fuel.

f = Index for baseline fuel types

The specific energy required to boil water using the baseline technology ($SE_{w,b,y}$) is determined as follows, by calculating the energy input required to obtain 1 L of boiling water, including boiling and vaporization losses[19], taking into account default or measured stove efficiency which is as per equation 2 of paragraph 3.6.2 and hence acceptable.

For baseline stove using firewood:
$SE_{w,b,y}$ = 360.83/η_{wb}
= 360.83/10%
= 3,608.3 KJ/L

and
for LPG stoves:
$SE_{w,b,y}$ = 360.83/η_{wb}
$= 360.83 / 57\%$
$= 633.04$ KJ/L

Where:

360.83 = Default amount of energy required to obtain 1 L of water after 5 minutes of boiling from a first principles approach[20] kJ/l

η_{wb} = Efficiency of the stoves for baseline water boiling (%). Weighted average of baseline stove types (10% for three stone firewood stove and 57% for LPG stove)..

For estimating volume of drinking water per premises, CME has used equation 7 in paragraph 3.6.8. The volume of drinking water per premises per day is determined by considering whether the capacity of the project device is sufficient to provide at least the default amount of drinking water, as follows:

$QPWhh,p,y$ = min $((qi \times tp,y \times DNp,y),(QPWp \times HNp,y))$

Where:

q_i = Capacity of the HWT or IWT individual project technology (L/h)

tp,y = Usage time of the project technology by premises type *p* in year *y* (h/day)

[19] The previous version of TPDDTEC Annex 3 assumed that purifying water by boiling would require boiling water for 10 minutes. This assumption is revised to 5 minutes, following WHO technical information that less than 5 minutes of boiling is sufficient for inactivation of enteric bacteria (Technical Brief WHO/FWC/WSH/15.02, 2015).

[20] This is calculated from the specific heat of water of 4.186 kJ/L ^{0}C, the difference between the initial and final water temperature assuming a start at 20 ^{0}C and end at 100 ^{0}C, evaporation of 1% of water during 5 minutes of boiling to obtain 1 L boiled water, and latent heat of water evaporation of 2260 kJ/L. Also, the latent heat required to boil one litre of water for five minutes is assumed to be equivalent to latent heat for the evaporation of 1 per cent of the water volume.

$DN_{p,y}$ = Average number of individual project technologies in each project premises type p in year y
$HN_{p,y}$ Number of individuals per premises type p (e.g. household, school) in year y
QPW_p = Volume of drinking water per person per day for premises type p (L). Apply the default value or monitored value through water consumption field tests in the project scenario, capped at 4 L per person per day.

Thus, VVB noted the CME has correctly applied all the equations and parameters for baseline emissions calculation as per the applied methodology and found to be correct.

Project Emissions

Section 3.7 of applied methodology details requirements for Project emission calculations which are assessed as below and confirmed.

As per paragraph 3.7.1, the project emissions may result from the operation of new low-emission water treatment technologies and shall be calculated as follows:

$$PE_y = PE_{ff,p,y} + PEec,p,y$$

Where:
PE_y = Project emissions in year y (tCO_2e)
$PE_{ff,,}$ = Project emissions from fossil fuel use in year y (tCO_2)
$PE_{ec,y}$ = Project emissions from electricity use in year y (tCO_2)

VVB has checked technical datasheet presented in section 1.3 above and on-site interviews have confirmed that HWT distributed does not use electricity or fossil fuel for operation and uses a zero-emission technology i.e., gravitational water filtering through hollow fibre filters. Hence, VVB accepts that there will not be any project emissions.

Hence, the project emissions (PE_y) from the current VPA would be 0 tCO_2e per year.

Leakage Emissions

Section 3.8 of applied methodology details requirements for leakage emission calculations which are assessed as below and confirmed.

VVB observed that for leakage calculations CME need to assess the VPA with respect to requirements of paragraph 3.8.1 to 3.8.3 with special attention of sub para of 3.8.2.1.

VVB noted that with current VPA implementation, CME will replace stoves using fuel wood for boiling water with HWT for safe drinking water. The baseline survey conducted by CME has established that fuel wood which is Non-Renewable biomass (NRB) is the only fuel being used by end users for boiling water. Thus, with use of HWT for safe drinking water, the VPA will reduce consumption of NRB within the VPA boundary.

CME through calculations as per CDM tool 30, version 4.0 has established that fuel wood is available in abundant (fNRB = 89.20%).

CME through baseline survey/2/ and on-site visit/interviews has confirmed that,

a. The only source of fuel for safe drinking water through boiling the same using stove is fuel wood with the project boundary. There are no other lower emitting energy sources available and with abundance availability of NRB, use of the non-renewable biomass saved under the project activity is negligible.
b. The proposed HWT system does not use NRB for its operation thus, the project will not reduce the NRB fraction within an area whereas its availability will increase due to less consumption during the project scenario.
c. The proposed VPA is for rural households. VVB based on regional expertise can confirm that the project population with the VPA area does not utilize space heating effect of water boiling. Thus, adopting some other form of space heating or by retaining some baseline wood fuel-burning practices for space heating is not a practical scenario.

Thus, in line with paragraph 3.8.3, CME has chosen to apply leakage factor of 5% and will reassess the sources and magnitude of leakage emissions at the time renewal of crediting period which is acceptable.

SDG impact calculations:

In section B.6.1 of VPA-DD/1/, CME has details SDG impacts and their parameters which are assessed below:

SDG 1: No Poverty

SDG indicator	Equation/calculation	VVB assessment
Target: By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	**1. water filter distribution records** Net Benefit (SDG 1) = $N_{p,y}$ Where: $N_{p,y}$ = Access to basic services (Accumulated number of premises type p with at least one individual project technology in year y)	VVB noted that with distribution of HWT as a part of safe drinking water programme, CME ensures that each household get Access to basic service i. e. safe drinking water which is appropriate. Same was confirmed to the VVB during the local stakeholder interview during the on-site inspection.

Indicator 1.4.1: Proportion of population living in households with access to basic services. **Approach:** Monitor the number of Water Filter distributed under the project as an indicator of providing basic service access to households		

SDG 3: Good Health and Well Being

SDG indicator	Equation/calculation	VVB assessment
Target: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination Indicator 3.9.1: Mortality rate attributed to household and ambient air pollution **Approach:** Monitoring Surveys conducted to record % users reporting a reduction in smoke/PM after they start using the water filter.	**Ex-post Monitoring Surveys Records** Net Benefit (SDG 3) = $SPM_{HH,Project}$ Where: $SPM_{HH,Project}$ = % HH reporting reduction in smoke/PM emissions after they start using the water filter in project scenario	With introduction of HWT, the end users will discontinue boiling water over stove using fire wood. VVB noted that this will attribute to reduction in ambient air pollution and hence this is accepted. CME will monitor this parameter on qualitative basis in %. Same was confirmed to the VVB during the local stakeholder interview during the on-site inspection.

SDG 4: Quality Education

SDG indicator	Equation/calculation	VVB assessment
Target: 4.3. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university Indicator: 4.3.1 Participation rate of youth and adults in formal and non-formal	**Ex-post Monitoring Surveys Records** Net Benefit (SDG 4) = $AP_{Project}$ - $AP_{Baseline}$ Where:	VVB noted that with HWT being distributed to each household within the VPA, the end users were also trained on the usage of water purifiers, as the implemented VPA is a rural and tribal dominant

education and training in the previous 12 months, by sex **Approach:** Monitor the number of awareness programs/training in a year.	$AP_{Baseline}$ =Number of Awareness program/training for using baseline = 0 $AP_{Project}$ =Number of Awareness program/training for using project scenario = 100%	district [21] . CME also conducted the Water, Sanitation & Hygiene (WASH) awareness trainings/9/ in the VPA implemented locations, which has helped manifold in terms of proper usage and hygiene maintenance. The parameter for monitoring is found appropriate.

SDG 5: Gender Equality

SDG indicator	Equation/calculation	VVB assessment
Target: 5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate Indicator: 5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age, and location **Approach:** Monitor the % users reporting time-saving due to reduction in collected fuel consumption/ water boiling time in the project	**Ex-post Monitoring Surveys Records** Net Benefit (SDG 5) = $HHT_{Project}$ - $HHT_{Baseline}$ Where: $HHT_{Baseline}$ = % HH reporting time saving due to reduced collected fuel consumption/water boiling time in baseline scenario = 0 $HHT_{Project}$ = % HH reporting time saving due to reduction in time saving to collect fuel wood/ water boiling time in project scenario = 100%	VVB noted that with HWT being distributed to each household within the VPA, the end users will have more impact on time spent on unpaid domestic work i. e. collection of fire wood as well as boiling the water for safe drinking purpose. The baseline survey and their corresponding results/2/ submitted by the CME confirms the same and the parameter for monitoring is found appropriate.

SDG 6: Clean Water and Sanitation

SDG indicator	Equation/calculation	VVB assessment
Target: By 2030, achieve universal and equitable access	**Water filter distribution records**	As a part of current VPA, CME is distributing HWT as a

[21] https://kvkdindori.nic.in

to safe and affordable drinking water for all Indicator 6.1.1: Percentage of population have access to improved source of water **Approach:** Monitor the number of Water Filter distributed/installed under the VPA as an indicator of providing basic service access to households.	Net Benefit (SDG 6) = $N_{p,y}$ Where: $N_{p,y}$ = Access to basic services (Accumulated number of premises type p with at least one individual project technology in year y)	part of safe drinking water system leading to access to safe and affordable drinking water for all. Same has been cross checked against the submitted project database/20/ and hence accepted by the VVB.

SDG 8: Decent Work and Economic Growth

SDG indicator	Equation/calculation	VVB assessment
Target: 8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value Indicator 8.5.1: Average hourly earnings of employees, by sex, age, occupation and persons with disabilities **Approach:** Recording the number of employees (male/female) in the project under administrative, distribution, and management positions	**Employment records** Net Benefit (SDG 8) = QE $IG_{Project}$ - QE $IG_{Baseline}$ Where: QE $IG_{Project}$ = Quantitative Employment and income generation (Number of persons (male and female) hired in Project scenario) QE $IG_{Baseline}$ = Quantitative Employment and income generation (Number of persons (male and female) hired in Baseline scenario)	As a part of current VPA, CME is distributing HWT as a part of safe drinking water system leading to access to safe and affordable drinking water for all. For the same, CME has employed 4 people that has main role in distribution, Monitoring & Evaluation of the water filters. Same was cross checked by the submitted employment records/13/ which includes the details of all the employees and also confirmed during the local stakeholder interview during the physical on-site inspection and hence accepted by the VVB.

SDG 12 - Responsible Consumption & Production

SDG indicator	Equation/calculation	VVB assessment

Reduction in consumption of renewable biomass **Approach:** Recording the amount of renewable biomass saved due to VPA.	Net Benefit (SDG 12) = $[Q_y*(360.83/N_{wb})*Xf_{wood}/15.6*10^3] * f_{NRB,f,y}$	VVB noted that the application of this SDG has ensured the sustainable usage of the natural resources, which is aided in the project scenario, as there is a significant decrease in the usage of fuelwood due to the implementation of this VPA. Additionally, validation from fNRB data/11/ further reinforces CME's sustainable practices, indicating efficient woody biomass utilization for end-user purposes.

SDG 13 – Climate Action

SDG indicator	Equation/calculation	VVB assessment
Target: Integrate climate change measures into national policies, strategies and planning Indicator: 13.2 Integrate climate change measures into national policies, strategies and planning **Approach:** Total greenhouse gas emissions per year	Net Benefit (SDG 13) = $BE_y = EF_b \times (1 - C_b - X_{cleanboil,}) \times Q_y \times M_{q,}$ Where: BE_y = Baseline emissions from the use of fuel to obtain safe water in the baseline (tCO_2e) EF_b = Emission factor for the use of fuel to obtain safe water in the baseline (tCO_2e/L) C_b = Proportion of project end-users who in the baseline were already using a safe water supply that did not require boiling (%) $X_{cleanboil,y}$= Proportion of project end-users that boil safe	The current VPA will reduce dependence of fuel wood used for boiling water in the baseline as established through baseline survey and suppressed demand baseline. Thus, the VPA in project scenario, will reduce the greenhouse gas emissions calculated as per applicable equations in the applied methodology which is acceptable.

	water in the project year y (%) Q_y = Quantity of safe drinking water provided by the project in year y (L) M_q,y = Modifier for the water quality in year y	

SDG 15 – Life on land

SDG indicator	Equation/calculation	VVB assessment
SDG Target 15.2 :By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally Indicator 15.2.1: Progress towards sustainable forest management. Project-specific Indicator: Reduction in consumption of non-renewable biomass. Approach: Reduction in consumption of non-renewable biomass for boiling water. Households will utilize less woody biomass that is not renewable. The ensuing decline in demand slows deforestation, raising the proportion of renewable energy in the project area's overall final energy consumption.	Net Benefit (SDG 15) = $[Q_y*(360.83/N_{wb})*Xf_{wood}/15.6*10^3]*f_{NRB,f,y}$ Where, N_{wb}= Efficiency of used cookstove in the baseline scenario Qy= Quantity of safe drinking water provided by the project. $f_{NRB,f,y}$= Fraction of non-renewable bio-mass. $15.6*10^3$= NCV of wood in KJ/Kg	The current VPA will reduce dependence of fuel wood used for boiling water in the baseline as established through baseline survey and suppressed demand baseline. Thus, the VPA in project scenario, will reduce the biomass consumption calculated as per applicable equations in the applied methodology which is acceptable.

Findings: CAR 02 was raised and closed successfully. Refer appendix 1 for more information.

3.11 Completeness of monitoring

The monitoring plan was checked and was confirmed to be in accordance with the applied methodology.

The validation team reviewed the monitoring plan during the on-site visit and from document review and compared it against the requirements of applied methodology DD and found in line.

The validation team assessed the monitoring techniques and each monitoring value in the VPA-DD; and provided a short summary on the validation of every parameter listed in the monitoring plan and used for calculation of emission reductions.

Data and parameters fixed ex ante:

CME has calculated baseline emissions as per section 3.6 of the applied methodology[4] and the ex-ante fixed parameters chosen by CME are assessed below:

1. **SDWS 2 -** Project technology description: The Project technology is hollow fibre cartridge installed in a stainless stell container for water purification. The water purifiers which are known as 'Econeer' are manufactured by GHG Reduction Technologies Pvt. Ltd. which is confirmed based on technical datasheet and on-site interviews with CME representative.
2. **SDWS 4 -** Regulatory framework for safe drinking water supply: VVB checked the website of ministry of Jal Shakti, Government of India (Policies | Department of Water Resources, River Development and Ganga Rejuvenation | India (jalshakti-dowr.gov.in). The ministry has mentioned multiple policies one of which is national water policy, 2012 which asks for framework to be established for water to everyone. Moreover, VVB noted that this or any other policy/regulation does not mandate or contradicts the VPA implementation. The same ministry has one more mission - https://jaljeevanmission.gov.in/ which is envisioned to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India. VVB during on-site visit have observed and confirmed that the project area does not have individual household tap connections.
3. **SDWS 5 -** Water sources in the project boundary: CME has conducted baseline survey of more than 200 households during February and March ,2023. The baseline survey results showed that 94.07% of water sources are unimproved sources like unprotected (open) well, spring/stream etc and 5.93% of water sources are improved one i. e. handpump. VVB during on-site interviews and visits have checked water sources for randomly selected end users and all of them were found to be using unimproved sources with either open well or running stream being used for water collection.
4. **SDWS 6 -** Stove technologies used in the project boundary: CME has conducted baseline survey of more than 200 households during February and March ,2023. The survey results showed 100% of the interviewed users are dependent on traditional three stone stove for clean water through boiling the same. VVB during on-site interviews and visits have checked and confirmed the same. As discussed above in section 3.7, The most recent study by Council on Energy, Environment and Water (CEEW) titled – "State of Clean Cooking

Energy Access in India" mentions that rural areas in Madhya Pradesh reply on firewood as the fuel for their daily needs though Liquified Petroleum Gas (LPG) is being promoted through government for clean cooking. The detailed assessment about non-use of LPG as a major fuel is already being discussed in the same section. CME has demonstrated the same in PDD section B.6.2. Hence, on a conservative measure, CME has chosen that 94.06% use basic cookstove i. e. traditional three stone stove and 5.94% are using LPG based stoves i. e. fossil fuel combustion system. Neither the baseline survey not on-site visit has found use of any other fuel within the sampled households. Hence this is found appropriate.

5. **SDWS 7 -** Expected technical life of project technology: This parameter is fixed for operational life of the HWT by the CME based on manufacturer's specifications. During desk review, VVB observed that the technical datasheet for the water purifier model – Econeer confirmed that the storage capacity of the unit is 10 litres with purifier having operational life of 15 years and membrane life of 10,000 litres.
6. **SDWS 8 -** x_f : CME has conducted baseline survey of more than 200 households during February and March ,2023. The survey established that 100% of users are using fuel wood for boiling the water. This was cross checked and confirmed during on-site visit by VVB. As per the methodology, baseline survey is one of the sources of data and CME has cross checked the same against government data[22] which provides % user dependent on fuel wood in the project area as 94.8%. This official government publication is more than 5 years old but provides conservative value and hence same was chosen by CME. However, as discussed above in section 3.7, The most recent study by Council on Energy, Environment and Water (CEEW) titled – "State of Clean Cooking Energy Access in India" mentions that rural areas in Madhya Pradesh reply on firewood as the fuel for their daily needs though Liquified Petroleum Gas (LPG) is being promoted through government for clean cooking. The detailed assessment about non-use of LPG as a major fuel is already being discussed in the same section. CME has demonstrated the same in PDD section B.6.2. Hence, on a conservative measure, CME has chosen that 94.06% use basic cookstove i. e. traditional three stone stove and 5.94% are using LPG based stoves i. e. fossil fuel combustion system. Neither the baseline survey not on-site visit has found use of any other fuel within the sampled households. Hence this is found appropriate.
7. **SDWS 9 -** $EF_{b,f,CO2}$ – CME has chosen value of CO_2e emission factor from use of fuel i. e. wood and LPG as per the applied methodology as 112 tCO_2/TJ and 63.1 tCO_2/TJ respectively which is checked and confirmed.
8. **SDWS 10 -** $EF_{b,f,nonCO2}$ - CME has chosen value of non- CO_2e emission factor from use of fuel i. e. wood and LPG as per the applied methodology as 9.46 tCO_2/TJ as per AR5 GWP and 0 tCO_2/TJ respectively which is checked and confirmed.
9. **SDWS 11 -** η_{wb} – VVB has noted during on-site visit that in the baseline conventional three Stone stoves are being used which is also confirmed from baseline survey results. Hence as per the applied methodology, CME has chosen default value of efficiency as 10% which his for Three-stone fire or a conventional system for Woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system, that is without either a grate or a chimney is found acceptable. For LPG stove, the efficiency is considered through literature review - https://www.ceew.in/sites/default/files/CEEW-Roadmap-for-Access-to-

[22] https://mp.census.gov.in/hindi/pdf/census2011/HLO%20report.pdf#page=369

Clean-Cooking-Energy-in-India-Report-31Oct19-min.pdf and value is established as 57% which is found appropriate.

10. **SDWS 12 -** C_b - CME has conducted baseline survey of more than 200 households during February and March ,2023. The survey established that Improved sources (Borehole or tubewell and Piped water (borehole or tubewell) are 5.93% (5.56%+0.37%). 31.25% of households with improved sources boil their water which means 31.25% out of 5.93% of improved sources are actually safe for drinking. Additionally, 0.37% households used some other treatment method (not boiling) to make water safe for drinking. This was cross checked and confirmed by VVB during on-site visits and interviews. Hence, value of 2.22% is acceptable.
11. **SDWS 13** - q_i – CME has considered value of the Capacity of the household or institutional water treatment technology as 06 litres which is based on technical specifications/18/. VVB has checked the technical datasheet/18/ to confirm this value and found acceptable.
12. **SDWS 21 –** $f_{NRB,f,y}$ – CME through use of CDM tool 30, version 4.0 has calculated value for fraction of non-renewable biomass as 89.2%. The detailed assessment of the same is presented in appendix 3 below and the value considered is accepted by VVB. VVB further noted that this value is fixed for Madhya Pradesh and if the regular VPAs to be added considered project boundary beyond the Madhya Pradesh, then this value will be re-calculated.
13. **SDWS 24 -** QPW_p – CME has considered value of volume of drinking water per person per day for premises type p as 4 l/day/person. This value is a default value as per option 1 for full day per the applied methodology. Hence the same was found acceptable.
14. **SDWS 30 -** $t_{p,y}$ – CME has considered value of Usage time of the project technology by premises type p in year y as 5 hours per day as per option 3 in the applied the methodology. Hence the same was found acceptable.

The values of ex-ante fixed parameters have been validated from the PoA-DD/1/. The validation team confirms that the values used/applied are correct and justified.

Finding:
CL 03 was raised and closed successfully. Refer appendix 1 for more information.

Opinion:
During the validation all monitoring parameters listed in Section B.6.2 of VPA-DD/1/ were compared with monitoring parameters and the monitoring plan of the PoA-DD/1/ and have been validated with regard to the:

1. appropriateness of the applied measurement / determination method,
2. the correctness of the values applied for ER calculation/3/,
3. the accuracy, and applied QA/QC measures.

Data and parameters monitored

Relevant SDG Indicator	**SDG 6 / SDG 13**

Data/parameter:	SDWS 18: $M_{q,y}$
Unit	Fraction
Description	Ongoing water quality indicated as the fraction of the samples that pass microbial quality standard requirements specified in relevant microbial quality standard for drinking water of the host country. In case a national standard is not available, the water quality shall comply with WHO Guideline values for verification of microbial quality i.e., all water directly intended for drinking must not have detectable E. Coli in any 100 ml sample i.e., less than 1 Colony Forming Unit (CFU) of E. Coli /100 ml.
Measured/calculated/default	Measured
Source of data	Source will be the water coming out from the water filter units which will be distributed and tested by 3rd party which is acceptable
Value(s) of monitored parameter	1
Monitoring equipment	3rd party water quality test analysis report/9/
Measuring/reading/recording frequency:	CME will measure the test results on an annual basis in line with the applicable national/international standard with 1st sampling after 06 months from the start date
Calculation method (if applicable):	N/A
QA/QC procedures:	CME will ensure that. a. laboratories who will conduct water quality testing are approved by local health authorities and/or have quality accreditation which is found appropriate. b. National drinking water standard of India (0 CFU E.coli/100ml) will be used as a reference (IS 10500: 2012[23]) for the tests conducted. c. The sampling results must satisfy at the minimum 90/10 rule for confidence/precision level d. Minimum 30 samples will be selected for the test to be conducted e. The test to be protocol will be IS 15185:2016 RA 2021.
Cross Checks	Not applicable as the value is based on 3rd party test report
Additional comment	CME has decided that emission reductions will not be claimed if certain thresholds as following are reached in case the proportion of samples not meeting the safe drinking water standards which is checked; Thresholds:

[23] Bureau of Indian Standards (2012) Indian Standard. Drinking Water – Specification. IS 10500 : 2012. Source: https://law.resource.org/pub/in/bis/S06/is.10500.2012.pdf

	- Project or VPA year 1: 20% - Project or VPA year 2: 15% - Project or VPA year 3 or above: 10% Further at the time of crediting period renewal, CME will ensure that the year number count continues, i.e. the second crediting period would encompass year 6, year 7, year 8, etc. Additionally, when the threshold is exceeded, the concerned VPA will provide an explanation for why this occurred and provide a remediation plan which is found appropriate.

Relevant SDG Indicator	**SDG 1**
Data/parameter:	SDWS 19
Unit	No. of water filters
Description	Number of Econeer water filter distributed/operational under the VPA as an indicator of providing access to basic services in the households. Contribute to providing access to basic services (clean cooking technology considered as basic service under access to modern energy) to the poor and vulnerable communities of India.
Measured/calculated/default	CME will measure this parameter
Source of data	The parameter measurement will be based on Econeer water filter distribution records / sales records which is found appropriate
Value(s) of monitored parameter	2,010
Monitoring equipment	N/A as this is measured based on CME records and hence found appropriate.
Measuring/reading/recording frequency:	The data measurement will be conducted on an annual basis which is found acceptable
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A As this is measured based on sales records / distribution records there are no QA/QC procedure which is acceptable CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.
Cross Checks	The parameter is no. of water filters distributed which can be checked through sales records and cross checked against project database submitted at the time of project monitoring to the verifier.

Relevant SDG Indicator	**SDG 3**
Data/parameter:	SDWS 19
Unit	Percent
Description	Percent of Household reporting reduction in incidences of waterborne diseases such as skin rashes, diarrhoea, foot sores, parasites, eye problems and other waterborne diseases.
Measured/calculated/default	CEM will measure this parameter
Source of data	CME will conduct monitoring survey at the start of each monitoring period to record % users who will report a reduction in smoke/particulate matter once they start using the water filter
Value(s) of monitored parameter	100
Monitoring equipment	N/A as it is a survey based value and acceptable.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A As this is measured based on survey results there are no QA/QC procedure which is acceptable CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.
Cross Checks	This parameter shall be monitored & cross checked during the verification of the real case VPA.

Relevant SDG Indicator	**SDG 4**
Data/parameter:	SDWS 19
Unit	Training/annum
Description	Contribute to increasing vocational and relevant skills of local individuals by providing non-formal education and training on issues related to climate change, with specific skill building in operations and surveying activities related to water filter distribution and its monitoring under GS.
Measured/calculated/default	Measured
Source of data	This parameter will be based on records of trainings conducted by the CME/13/
Value(s) of monitored parameter	1
Monitoring equipment	N/A as it is a training records based value and acceptable.

Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A as this is measured based on training records and hence there are no QA/QC procedure which is acceptable CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.
Cross Checks	This parameter shall be monitored & cross checked during the verification of the real case VPA.

Relevant SDG Indicator	**SDG 5**
Data/parameter:	SDWS 19
Unit	Percentage
Description	% Households reporting time saving due to reduction in time saving to collect fuel wood/ water boiling time.
Measured/calculated/default	Measured
Source of data	This parameter will be based on monitoring survey data submitted by the CME/2/
Value(s) of monitored parameter	100
Monitoring equipment	N/A as it is a survey based value and acceptable. During interview with CME representative, it was confirmed that the parameter will be measured based on qualitative information collected during Monitoring surveys. CME persons/interviewer will ask end users whether they spent less time collecting wood fuel for the project water purifier units and/or required less time for boiling the water in order to make it suitable for drinking purpose after usage of Econeer (HWT units) as compared to the baseline scenario. The collected results will then be extrapolated on all the end users for this project which is found appropriate.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A as this is measured based on survey conducted by the CME and hence there are no QA/QC procedure which is acceptable CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.

Cross Checks	This parameter shall be monitored & cross checked during the verification of the real case VPA.

Relevant SDG Indicator	**SDG 6**
Data/parameter:	SDWS 19
Unit	No. of persons
Description	Monitor the number of Water Filter distributed /installed /operational under the VPA as an indicator of providing basic service access to number of persons. Further the CME has included below parameters to ensure the compliance towards SDG 6 i.e. (i) Level of service- The water filter being distributed in the VPA are of safely managed household units as pure drinking water is available whenever needed and free from any contamination. (ii) Project contributions: The water being discharged from distributed water filters is easily accessible, available 24 hours in a day and on quality also it is free from any kind of contaminations.
Measured/calculated/default	The parameter would be measured based on quantitative information collected by the CME which is found acceptable
Source of data	This parameter will be based on monitoring survey data submitted by the CME/2/
Value(s) of monitored parameter	10,774
Monitoring equipment	N/A as it is a survey based value and acceptable. CME will measure the parameter based on quantitative information collected during Monitoring surveys conducted and the value of the parameter will be conducted as below which is found appropriate. Total no. of population has access to improved source of water= Total no of water filters work x Average no of members in household.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A as this is measured based on survey conducted by the CME and hence there are no QA/QC procedure which is acceptable

	CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.
Cross Checks	This parameter shall be monitored & cross checked during the verification of the real case VPA.

Relevant SDG Indicator	**SDG 7**
Data/parameter:	SDWS 19
Unit	Number of water filters
Description	Number of Econeer water filter operational under the VPA as an indicator of providing access to basic services in the households. Contribute to providing access to basic services (clean water purification technology considered as basic service under access to modern energy) to the poor and vulnerable communities of India.
Measured/calculated/default	Measured
Source of data	This parameter will be based on monitoring survey data submitted by the CME
Value(s) of monitored parameter	2,010
Monitoring equipment	N/A as it is a survey based value and acceptable. CME will measure the parameter based on quantitative information collected during Monitoring surveys conducted which is found appropriate.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A as this is measured based on survey conducted by the CME and hence there are no QA/QC procedure which is acceptable CME will ensure that data is kept for 02 years after the crediting period or from the last issuance.
Cross Checks	This parameter shall be monitored & cross checked during the verification of the real case VPA.

Relevant SDG Indicator	**SDG 8**
Data/parameter:	SDWS 19
Unit	Number of persons
Description	Number of employments generated due to VPA implementation

Measured/calculated/default	Measured
Source of data	The parameter will be measured based on the employment records by the CME at various levels such as administrative, distribution, and management positions which is found appropriate.
Value(s) of monitored parameter	4
Monitoring equipment	N/A as it is a employment records based value and acceptable.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	Since this is a measured value, no calculation method is applicable.
QA/QC procedures:	N/A CME will keep this data for two years after the crediting period or from the last issuance.
Cross Checks	During VPA implementation and its period verification, CME will submit Employment records & employee salary slips[13] which can be cross checked through on-site / remote interviews with the stakeholders in the VPA implemented areas.

Relevant SDG Indicator	**SDG 12**
Data/parameter:	SDWS 19
Unit	Tonnes
Description	Tonnes of renewable biomass saved
Measured/calculated/default	Calculated
Source of data	Ex-ante ER spreadsheet[3] Calculated using the below formula (as per section 6 of VPA-DD): $[Qy*(360.83/N_{wb})*Xf_{wood}/15.6*10^3] *(1- f_{NRB,f,y})$
Value(s) of monitored parameter	369.00
Monitoring equipment	Calculated
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A

Cross Checks	The value calculated in the ex-ante ER sheet is based on energy requirement for boiling 1 litre of water, efficiency of the baseline stove, manufacturer specifications for water filter capacity and fNRB value calculated by the CME. These values were checked along with the equations and formulae. VVB noted that these are correctly referenced and hence accepted by the VVB.

Relevant SDG Indicator	**SDG 15**
Data/parameter:	SDWS 19
Unit	Tonnes
Description	Tonnes of non-renewable biomass saved
Measured/calculated/default	Calculated
Source of data	Ex-ante ER spreadsheet[3] Calculated using the below formula (as per section 6 of VPA-DD): $[Qy*(360.83/n_{wb})*Xf_{wood}/15.6*10^3] * f_{NRB,f,y}$
Value(s) of monitored parameter	3,053.00
Monitoring equipment	Calculated
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Cross Checks	The value calculated in the ex-ante ER sheet is based on energy requirement for boiling 1 litre of water, efficiency of the baseline stove, manufacturer specifications for water filter capacity and fNRB value calculated by the CME. These values were checked along with the equations and formulae. VVB noted that these are correctly referenced and hence accepted by VVB.

Relevant SDG Indicator	**SDG 6**
Data/parameter:	**SDWS 20: Water hygiene education campaigns**
Unit	NA
Description	Hygiene campaigns carried out among project safe water end users.

Measured/calculated/default	Measured
Source of data	The parameter will be measured based on report of annual hygiene campaigns results which is found appropriate
Value(s) of monitored parameter	1
Monitoring equipment	N/A as this value is based on the campaigns conducted. CME will conduct the hygiene campaigns and same will be assessed by CME using the WHO/UNICEF Joint Monitoring Programme Core questions[24] for drinking water and hygiene to determine the fraction of the households and institutions where Safe water and Hygiene practices are found to fulfil "safely managed" or "basic" requirements. CME will ensure that in-person or telephone or by messaging (e.g. text, app) based survey will be conduct covering all the core questions for drinking water and core questions for hygiene which can be cross checked during the verification. VVB noted that the fraction of the households where Safe water and Hygiene practices are found to fulfil "safely managed" or "basic" requirements is expected to increase over time as a successful conduction of the hygiene campaigns and can be confirmed through annual results of these campaigns by the verifying VVB.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A as this is a measured value
QA/QC procedures:	
Cross Checks	VVB noted that these campaigns will be conducted on annual basis using JMP core questions for households, schools and health care facilities are available at https://washdata.org/monitoring/methods/core-questions CME when interviewed confirmed that, the in-person or telephone or by messaging (e.g. text, app) based survey with households will be conducted on sample basis following section 4.2 of the applied methodology which is acceptable.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**SDWS 22 -** $X_{cleanboil,y}$

[24] https://washdata.org/monitoring/methods/core-questions

Unit	%
Description	Proportion of project end-users that boil safe (treated, or from safe supply) water after installation of project technology in year y. Percentage includes proportion of end-users that switched back to boiling water and proportion of end users that boil water after treatment with the project technology.
Measured/calculated/default	Measured
Source of data	The value will be measured based on project surveys conducted during verification which is found appropriate.
Value(s) of monitored parameter	0 (assumption for ex-ante calculation)
Monitoring equipment	N/A as this value is based on the survey being conducted.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Cross Checks	VVB noted the CME has confirmed that annual project survey (monitoring surveys) will be conducted on sample basis following the guidance as per section 4.2 of applied methodology which is found acceptable. CME will conduct this survey in person, by telephone, by messaging (e.g. text, app) as, appropriate to the context which is allowed by methodology and hence accepted.

Relevant SDG Indicator	**SDG 13**
Data/parameters:	SDWS 25: $HN_{p,y}$
Unit	Number
Description	Number of individuals per premises type p in the project boundary in year y
Measured/calculated/default	Measured
Source of data	Project survey; official government publications or statistics
Value(s) of monitored parameter	5.36 (assumption for ex-ante calculation)
Monitoring equipment	N/A as this value is based on the either project survey or official publications or statistics

	If the value is based on survey conducted then CME will ensure that survey is conducted as per section 4.2, General requirements for sampling of the methodology "Emission reductions from Safe Drinking Water Supply", v.1.0 which is found acceptable.
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	VVB noted that the applied value can be cross-checked against at least one other source on the list. For cross-check purposes, sources applied will be up to 5 years old. Further, cross-check with older sources will be used provided they provide conservative results. Further in the project scenario, the same has been crosschecked during the monitoring survey conducted.
Cross Checks	VVB noted the CME has confirmed that annual project survey (monitoring surveys) will be conducted on sample basis following the guidance as per section 4.2 of applied methodology which is found acceptable. CME has confirmed that the monitored value will be cross checked against at least one source of the following: - Official government publications or statistics - Credible published literature for project region, or - Studies by academia, NGOs or multilateral institutions For cross-check purposes, sources applied will be up to 5 years old. Further, cross-check with older sources may be used provided they provide conservative results

Relevant SDG Indicator	**SDG 1, SDG 6 and SDG 13**
Data/parameter:	SDWS 28: $N_{p,y}$
Unit	Number
Description	Accumulated number of premises type p with at least one individual project technology in year y
Measured/calculated/default	The value will be measured based on the CME distribution records
Source of data	CME Distribution records[20]
Value(s) of monitored parameter	2,010
Monitoring equipment	N/A as the value will be based on the distribution records
Measuring/reading/recording frequency:	Annual

Calculation method (if applicable):	N/A
QA/QC procedures:	The Distribution records which will be used for the parameter monitoring will include the following information i. Date of sale/distribution ii. Geographic area of sale iii. Model/type of project technology sold iv. Quantity of project technologies sold as confirmed during interviews with CME representatives. The records will also have name and telephone number, and address (if available) or other traceable indicator of premises identity and location for all end users as confirmed by the CME representative.
Cross Checks	VVB noted the CME has confirmed that annual project survey (monitoring surveys) will be conducted on sample basis following the guidance as per section 4.2 of applied methodology which is found acceptable. CME will ensure that units shall not be counted in Np,y after the end of their technical life, unless this is addressed by the measures to manage the cases where the expected technical life of the project technology is shorter than the crediting period, namely replacement or retrofit as described in the parameter SDWS 7.

Relevant SDG Indicator	**SDG 6 and SDG 13**
Data/parameter:	**SDWS 29: $U_{p,y}$**
Unit	%
Description	Usage rate of the project technology by premises type p during year y
Measured/calculated/default	Measured
Source of data	The values will be measured based on survey conducted in line with the annex 1: Usage Surveys Guidelines – HWT Technologies in the applied methodology which is appropriate
Value(s) of monitored parameter	1 (assumption for ex-ante calculation and in person survey, resulting fraction has been multiplied by 100%)
Monitoring equipment	N/A as the value is based on survey conducted.

	CME will ensure that in-person survey will be conducted for all the project households covering all topics outlined in Annex – 1 of the applied methodology. CME may count Households that show at least once-in-two-days use as users. The resulting fraction will be multiplied by 100% to get Up,y Where project technologies of different ages are being credited, the sample will be representative of the distribution of project technology ages. CME will ensure that the minimum sample size for HWT - for individual technology age-group shall be minimum 30 household.
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures:	Where a WCFT is undertaken to determine QPW_p, this may be used to cross check the usage percentage.
Cross Checks	CME confirmed that in-person survey of project households covering all topics outlined in Annex – 1 of the applied methodology will be conducted. Households that show at least once-in-two-days use will be counted as users. The resulting fraction is multiplied by 100% to get the value of the parameter. Where project technologies of different ages are being credited, the sample shall be representative of the distribution of project technology ages. The minimum sample size for HWT - for individual technology age-group shall be minimum 30 household. The minimum sample size for IWT – for individual technology age group will be determined considering the project technology type and in line with the sampling approach applied. For minimum sample size requirements for different sampling approach Guidelines for sampling and surveys for CDM project activities and programmes of activities version 09.0 will be followed. The usage survey provides a single usage parameter that is representative for project technologies in the total sales record.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**SDWS 30:** $t_{p,y}$
Unit	Hours per day

Description	Usage time of the project technology by premises type p in year y
Measured/calculated/default	Default
Source of data	Default value as per option 3 of the applied methodology
Value(s) of monitored parameter	5
Monitoring equipment	N/A
Measuring/reading/recording frequency:	Annual
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Cross Checks	Since default value has been used, no cross check required.

Relevant SDG Indicator	**SDG 13**
Data/parameter:	**SDWS 31: $DP_{p,y}$**
Unit	Days
Description	Average days the project technology is present for end-users in the premises p in year y
Measured/calculated/default	Measured
Source of data	The value will be based on CME distribution records conducted for the monitoring periods
Value(s) of monitored parameter	365 (assumption for ex-ante calculation)
Monitoring equipment	N/A
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Cross Checks	VVB noted that CME will decide the value based on the sales or distribution records of "Date of sale/distribution"/20/ and ex-ante parameter "Expected technical life of project technology," for each project device. It will check for how many days of the year, the HWT was in the premises and within its technical life will be

	determined. Then the average for all the project technology will be calculated by premises type p to obtain this parameter which is acceptable.

Relevant SDG year Indicator	**SDG 13**
Data/parameter:	**SDWS 32: $DN_{p,y}$**
Unit	Number
Description	Average number of individual project technologies in each project premises type p in year y
Measured/calculated/default	Measured
Source of data	The value would be based on CME Distribution records
Value(s) of monitored parameter	1 (assumption for ex-ante calculation)
Monitoring equipment	N/A as this is based on the distribution records
Measuring/reading/recording frequency:	Every 2 years CME will be monitor this parameter based on the sales or distribution records of "Quantity of project technologies sold" and identifying information of buyer/recipient to arrive at the value of the average number of project devices per premises.
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
Cross Checks	VVB noted that Based on the sales or distribution records of "Quantity of project technologies sold" and identifying information of buyer/recipient, calculate the average number of project devices per premises. If the project covers different types of end-users (e.g. households, institutions), the average number must be determined per premises type p.

The validation team confirms;

a) The monitoring plan implemented is in line with monitoring plan included in the applied methodology and PoA-DD/1/.
b) The monitoring complies with the requirement of the applied methodology.
c) The information inflow (from data generation, aggregation, to recording, calculation and reporting) is included above under each parameter and confirms to the requirement of the PoA-DD.
d) The findings relevant to each parameter, wherever appropriate are discussed in detail in Appendix 1 of this report.

In summary, the validation team confirms that all the ex-post parameters are correctly mentioned as per the monitoring plan of VPA-DD/1/ and applied methodology/4/.

Finding:
No findings raised.

Opinion:

The adequacy and compliance of the monitoring plan in the VPA-DD was found as per the requirements laid by the monitoring methodology and the validated PoA-DD. The information flow (from data generation, aggregation, to recording, calculation and reporting) is already included under respective parameter above.

The validation team has assessed all the data and collected evidence as per the required monitoring frequency and found to be correct and appropriate meeting the requirements of the applied methodology and validated PoA-DD/1/.

3.12 Management and Operational System

The responsibilities of data measurement, collection, verifying, archiving etc. have been clearly defined in the VPA-DD/1/. It was confirmed by the assessment team during the on-site visit. The data related to ER calculation as well as data monitoring, collection process etc. have been internally reviewed by the CME management team regularly.

The information flow of each parameter has been verified by the assessment team via interviewing with responsible personnel.

During the on-site visit assessment, it was confirmed that the monitoring procedure as well as the internal quality management and control procedures are stipulated in the VPA-DD. The monitoring personnel have been interviewed by the assessment team and it's confirmed that the monitoring will be implemented as per the procedure. Also, the training record (training register and attendance sheet)/13/ has been checked by the assessment team and it is confirmed that the monitoring personnel are sufficiently trained to perform the monitoring.

CME will collect, monitor the data during the crediting period and it will be stored electronically for at least two years after the end of the VPA crediting period.

Finding:

No findings raised.

Opinion:

All the data and documents, either hard copies or soft copies, will be kept for two years after the end of the last crediting period or the last issuance of GSVER for this Project, whichever occurs later.

4. REFERENCE

No.	Author	Title	References to the document	Provider
1.	CME	Initial Project Design Document (PoA-DD)	Version 01.0, dated 05/06/2023	CME
		Final Project Design Document (PoA-DD)	Version 02.0, dated 02/06/2024	
		Initial Voluntary Project Activity - Design Document (VPA-DD)	Version 01.0, dated 12/06/2023	
		Final Voluntary Project Activity - Design Document (VPA-DD)	Version 4, dated 07/02/2025	
2.	CME	Baseline survey report & the corresponding results	Version 01.0	CME
3.	CME	Ex-Ante ER Sheet (Initial) Ex-Ante ER Sheet (Final)	Version 01.0 Version 03.0	CME
4.	GS4GG	Applied methodology: Methodology for emission reductions from safe drinking water supply CDM Tool 30: Calculation of the fraction of non-renewable biomass	Version 1.0 Version 4.0	Public
5.	GS4GG	**GS4GG activity requirements:** • Principles & Requirements • Stakeholder consultation and engagement • Programme of Activity requirements • Community Service Activity requirements	 Version 1.2 Version 2.1 Version 2.1 Version 1.2	Public

		• Safeguarding principles & requirements • GHG emissions reductions & sequestration product requirement • Microscale Project Requirements • Validation and verification standard • Guideline for Sampling and surveys for CDM project activities and programmes of activities • Standard for "Sampling and surveys for CDM project activities and programmes of activities"	Version 2.1 Version 2.3 Version 1.2 Version 1.0 Version 03.0 Version 09.0	
6.	CME	Sample copies of end user agreement between Beneficiaries & CME (with the project start date 11/05/2023)	-	CME
7.	CME	CME declaration for ownership of Carbon Credits	Dated 16/04/2024	CME
8.	CME	GS4GG Preliminary Review Request form Screenshot of the E-mail sent to local stakeholders for GS4GG Stakeholder Feedback Round (SFR) round	Dated 06/06/2023 Dated 10/05/2023	CME
9.	CME	• Water Quality Test (by third party NABL approved lab) – Ashwamedh Engineers and Consultants. • Water, Sanitation & Hygiene (WASH) records submitted by CME	Dated 12/11/2023 to 19/12/2023 Dated 21/11/2023	CME
10.	CME	KML file of the VPA implemented location	-	CME
11.	CME	fNRB calculation database (Initial) fNRB calculation database (Final)	Version 01.0 Version 02.0	CME
12.	CME	Grievance Register	-	CME

13.	CME	• Training/Awareness programs conducted by CME for beneficiaries • Photographic Evidences of training & Awareness programs • Employment Records/salary slips of the SMG employees (on sample basis)	-	CME
14.	CME	Date of first submission to GS for preliminary review	Dated 06/06/2023	CME
15.	CME	ODA declaration for the Programme of Activity ODA declaration for VPA- 1(12220)	Dated 26/03/2024 Dated 31/05/2023	CME
16.	CME	No Double counting declaration from CME that VPA is neither registered as GS4GG or CDM project activities, included in another	Dated 21/03/2024	CME
17.	CME	Sampling records by CME	-	CME
18.	CME	Technical specifications of the Household Water Treatment Unit's (HWTs) including its design lifetime HWTs photographs	-	CME
19.	Excellent Bio Research Solutions Private Limited	Lab test reports of sources available in baseline	-	CME
20.	CME	• CME agreement with distribution agency- for distribution & maintenance of HWTs (EKIESL and AARANSH AGRO TECH) • Service Agreement between CME (EKIESL) and GHG Emission Reduction Technologies Private Limited. • Distribution records/Project Database	Dated 12/04/2023 Dated 18/03/2023	CME

21.	CME	Stakeholder Consultation Report	Dated 12/06/2023, Version 01.0	CME
22.	CME	Local stakeholder consultation report held at VPA level along including attendance sheet, invitation letters, feedback forms and minutes of meeting	-	CME
23.	CME	GS4GG Preliminary Review Request form CME's registration certificate	Dated 01/08/2023 -	CME
24.	GOI	Ministry of Labor and Employment	https://labour.gov.in/	Others
25.	GOI	National Prevention of Corruption Act of Government of India	http://legislative.gov.in/sites/default/files/A1988-49.pdf	Others
26.	United Nation	Universal declaration of Human Rights	https://www.un.org/en/universal-declaration-human-rights/	Other

5. FINAL PROJECT DESIGN CERTIFICATION STATEMENT

Applus+ Certification have performed a validation of the "GS12219 VPA-1 Water filter project in Dindori, Madhya Pradesh, India". The validation was performed on the basis of GS4GG guideline and host country criteria, as well as criteria given to provide for consistent VPA operations, monitoring and reporting.

The review of the GS4GG VPA-DD and the subsequent follow-up interviews during the on-site visit has provided Applus+ Certification with sufficient evidence to determine the fulfilment of stated criteria. In our opinion, the VPA meets all relevant GS4GG requirements and all relevant host country criteria. The VPA will hence be recommended by Applus+ Certification for registration with the Gold Standard Registry and inclusion under PoA.

The VPA aims to distribute safe drinking water technology and thereby reducing fuel consumption during the boiling activities during the baseline and thus reducing greenhouse gas emission and contributing to climate change mitigation in line with the UN's Sustainable Development Goals, the project is foreseen to provide several SDG benefits for the local families and communities. Given that the project is implemented as designed, the project is likely to achieve the estimated amount of average annual emission reductions of 5,745 tCO_2e per year.

The validation has been performed following the requirements of the GS4GG guidelines and on the basis of the contractual agreement.

In detail the conclusions can be summarized as follows:

- The VPA does not result in negative social, environmental and/or economic impacts.

- The VPA contribution to Environment, Social Development and Economic and technological development
- The VPA additionality is sufficiently justified in the Gold Standard VPA-DD
- The VPA does not result in diversion of ODA.
- Conservative assumptions were applied in the VPA description.
- The monitoring plan of SDG parameters is transparent and adequate.
- The VPA meets the stakeholder consultation requirements.

The conclusions of this report shows that the VPA, as it was described in the VPA documentation, is in line with all criteria applicable for the validation.

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Date: 12/02/2025

Lead Auditor/Technical Expert: Mr. Deepak Pundlik

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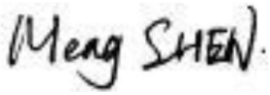
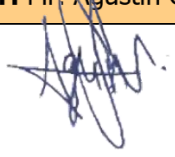
Tech. Reviewer: Mr. Simon Shen

Approver *(Applus+ Certification VVB Technical Manager)*

Mr.Agustín Calle de Miguel

ASSESSMENT TEAM	
Lead Auditor: Mr. Deepak Pundlik	**Technical Reviewer: Mr. Simon Shen**
Signature: 	Signature: 
Approver: Mr. Agustín Calle de Miguel	
Signature: 	

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Appendix 1: Corrective Action Request/Clarification Request/Forward Action Request resolution table

Table 1. Remaining FAR from validation and/or previous verifications

Type:	☐ CAR ☐ CL/CR ☒ FAR	Number:	01
Raised by:	SustainCert	Ref. to checklist in GS4GG FVaR:	Preliminary review
Description of the audit finding		Date:	01/03/2024
FAR 1: Invitation information for category E stakeholders is missing in section B of the LSC report. Kindly check and verify.			
Project Participant's response		Date:	16/04/2024
All the stakeholder category including category E were invited during the SFR round as per template requirement. The email evidence is attached for your reference.			
Documentation provided as evidence by Project Participant			
-			
Auditor's assessment comment		Date:	12/05/2024
Inclusion of category E stakeholder which was confirmed through e-mail copy as well as stakeholder consultation documents submitted by CME. Same confirms that category E stakeholders were invited for SFR round hence, FAR is closed.			

Table 2. CLs from this validation

Type:	☐ CAR ☒ CL/CR ☐ FAR	Number:	01
Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024

Under KPI Table & section A of submitted GS VPA-DD:

1. In table 1, for SDG3, CME shall clarify in detail, how it's concluded that 100 % Indoor Air Quality and water borne diseases has been reduced.
2. In section A.2, CME shall clarify Why extreme geographic coordinates have been referred if current VPA belongs to only district Dindori, Madhya Pradesh.
3. Technical specification of incorporated Water filter and their subparts shall be required to validate the incorporated information under section A.3

Under KPI Table & section A of submitted GS VPA-DD:

1. CME shall revise the KPI & VPA DD template with latest available version available GS4GG Template Portal.
2. In section A.1, CME shall clearly define the short summary on Project boundary and Project baseline in line with para 3.1 and 3.2 of applied methodology and VPA DD Template Requirement.
3. Incorporated estimated emission reductions over the 5-year crediting period observed to be inconsistent with estimated ER Spreadsheet. Corrective action shall be required.
4. In section A.1.1, CME shall demonstrate applicability as per sub para 3.1.1 - (a) to (h) of applicable Gold Standard GS4GG "Principles & Requirements", Version 1.2.

Project Participant's response	Date:	26/03/2024

1. This is an estimated data as we assume that all beneficiary will use the water filter so, in that condition they will not use wood for boiling water. Thus, the Indoor Air quality and water borne diseases will be reduced. The actual data may be varied as per monitoring survey result in subsequent verification.

2. The geographical boundaries of the PoA-DD is all over world while for the first real case VPA, the geographical area is in the Dindori and Anuppur District of Madhya Pradesh in India. The extreme coordinate of the project is now updated in VPA-DD.

3. Technical Specification of the water filter has been provided.

VPA-DD:

1. KPI & VPA DD template has been revised as per latest available template v2.3.

2. The project boundary and baseline scenario has been included as per the comment raised.

3. Estimated ER sheet and Actual ER Sheet for the current monitoring period has been submitted

4. VPA DD has been revised and applicability criteria has been included

Documentation provided as evidence by Project Participant

1. https://registry.goldstandard.org/projects/details/4213

2. No double counting declaration

3. Distribution database, beneficiary distribution form and end user agreement.

4. Filter specification brochure

5. Water filter test report

6. Manufacturer declaration for lifetime of project

7. VPA-DD_V02

8. KML file for the project

9. Technical specification

Auditor's assessment comment	Date:	02/05/2024

Under KPI Table & section A of submitted GS VPA-DD:

1. CME's response is accepted, as this is design certification and estimated values can be considered as 100%. Further, during the subsequent verification of this VPA, the SDG monitored values shall be verified accordingly. Hence this part is closed.
2. The geo-coordinates of the project boundary of this VPA have been revised by CME, covering two districts Dindori & Anuppur in the Madhya Pradesh state of India, which is consistent as per the submitted KML file. Therefore, this point is closed.
3. Technical specifications as provided by the manufacturer GHG Reductions Technologies Pvt. Ltd. has been provided by the CME, information of which is found to be consistent as mentioned under the section A.2 of the Poa-DD version 2.0. Thus, this part is closed.

Under KPI Table & section A of submitted GS VPA-DD:

1. Submitted VPA-DD version 2.0 has been revised & KPI also updated as per the latest VPA template as available on GS4GG website. Therefore, this part is closed.
2. Section A.1 of the revised VPA-DD version 2.0 has been checked by VVB and it was observed that both project boundary which is the two districts i.e. Dindori & Anuppur as well as baseline scenario about how the unimproved water was used for drinking purposes. Same is

in line with the VPD-DD template guidelines and the applied methodology. Thus, this part is closed. 3. Under the same section of the revised VPA-DD version 2.0, estimated ERs has now been correctly mentioned as per the Estimated ER Sheet, which is now consistent. Thus, this part is also closed. 4. Section A.1.1 of the VPA-DD version 2.0 has been revised, which now includes the applicability criteria for inclusion of VPAs in PoA in line with the VPA template guidelines as well as GS4GG "Principles & Requirements", Version 1.2. Therefore, this part is closed. CL closed.

Type:	☐ CAR ☒ CL/CR ☐ FAR	Number:	02
Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024
Under section B.6.2 of VPA_DD: 1. With reference to requirement of applied methodology for parameter SDWS 8, "Source applied must not be more than 3 years old". CME shall further clarify with the referred literature /official publication or statics attached under the footnote.			
Project Participant's response		Date:	26/03/2024
The project developer has used the reference source of the parameter to be from the Madhya Pradesh state census data which is the latest available source of information being available to the project developer in public domain. This had been further confirmed during the monitoring survey conducted by the CME as well as a secondary source of information published by National Family Health Survey of Dindori (2019-21). https://rchiips.org/nfhs/nfhs-5_fcts/MP/Dindori.pdf			
Documentation provided as evidence by Project Participant			
POA/ VPA DD Monitoring survey reports			
Auditor's assessment comment		Date:	13/05/2024
CME response is clear, as for the parameter SWDS 8, CME has chosen the official source of data as the official - government publications or statistics which has been published by National Family Health Survey of Dindori (2019-21). In accordance with the applied methodology, it can be confirmed by the VVB that since the data is more than 3 years old, they have applied conservative results which is taken from the baseline survey submitted by the CME. Hence this part of CL is closed.			

Type:	☐ CAR ☒ CL/CR ☐ FAR	Number:	03
Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024
Under section B.7.1 of VPA_DD: 1. CME shall clarify which procedure has been applied for HWT/IWT types water filters. 2. CME shall clarify why SDWS 19 and their corresponding monitoring table is not included. 3. Applied value for parameter SDWS 24, observed to be inconsistent with applied methodology. Kindly clarify.			

4. For SDWS 25, Source applied must not be more than 3 years old as per applied methodology monitoring parameter SDWS requirement.
5. For SDWS 29, With reference to monitoring parameter, kindly clarify which option has been used for usage survey under current VPA.

Project Participant's response	Date:	26/03/2024

1. For HWT type filter we have applied Indian standard IS10500:2012 for the bacterial quality standard which is national drinking water standard of India and for water quality test as per Indian standard IS 15185:2016 has been followed. The following information has been updated in section B.7.1 of the VPA-DD.

2. SDWS 19 and their corresponding monitoring table is now included in the section B.7.1 of VPA-DD.

3. For parameter SDWS 24 volume of drinking water per person per day for full premises, we have considered the default value i.e., 4L/person/day as per applied methodology. The same has been updated in the relevant section of VPA-DD.

4. The project developer has used the reference source of the parameter to be from the Madhya Pradesh state census data which is the latest available source of information being available to the project developer in public domain.

Further the same has been crosschecked from the monitoring survey reports and thus deemed justified.

5. For SDWS 29, CME has chosen option 1 i.e., In-person survey of project households for usage survey under current VPA. The same has been updated.

Documentation provided as evidence by Project Participant

1. VPA-DD_v02

2. VPA-DD_v02

3. VPA-DD_v02

4. VPA-DD_v02 & Monitoring survey reports

5. VPA-DD_v02

Auditor's assessment comment	Date:	03/05/2024

Under section B.7.1 of VPA_DD:

1. As checked in the revised PoA-DD version 2.0, the water purification procedure applied follows the host country guideline i.e. IS10500:2012 for the bacterial quality standard which is national drinking water standard of India and the prescribed water quality test as per Indian standard IS 15185:2016, as checked from the given referral weblink: https://law.resource.org. hence this part is closed.
2. As per the applied methodology, parameter SDWS 19 i.e. 'no. of water filter' has now been reflected under the section B.7.1 of the PoA-DD version 2.0, which is now consistent. Therefore, this part of CL is closed.
3. The applied default value of '4' for the parameter SDWS 24 as per the applied GS methodology has now been mentioned in the data & parameter table under section B.6.2 of the VPA-DD version 2.0. Thus, this part is closed.
4. For the parameter SWDS 25, CME has chosen the official source of data as the official - government publications or statistics which is the 2011 MP Census data. In accordance with the applied methodology, it can be confirmed by the VVB that since the data is more than 5 years old, they have applied conservative results which is taken from the project survey submitted by the CME. Hence this part of CL is closed.

5. In line with the applied GS4GG methodology, CME has used option 1 i.e. *'In-person survey of project households covering all topics outlined in Annex - 1. Households that show at least once-in-two-days use may be counted as users',* wherein it was found that annex 1 Usage survey guidelines of the methodology has been clearly demonstrated in the submitted Usage survey sheet, therefore this part of CL is closed. CL closed.

Type:	☐ CAR	☒ CL/CR	☐ FAR	Number: 04
Raised by:	VVB			Ref. to checklist in GS4GG FVaR: -
Description of the audit finding				Date: 01/03/2024
Under section B.7.2 of VPA_DD Minimum sample size 30 has been taken, CME shall clarify how para 4.2.3 of the applied methodology has been followed during the baseline /project survey.				
Project Participant's response				Date: 16/04/2024
Sampling procedure has been revised and minimum sample size of 130 has been taken into consideration				
Documentation provided as evidence by Project Participant				
VPA DD Version 02				
Auditor's assessment comment				Date: 03/05/2024
Revised VPA-DD version 2.0 was checked by VVB, and it was found that in accordance with the para 4.2.3 of the applied methodology, since the group size for the baseline survey is more than 1000 (third condition), hence the sample size should be more than 100, i.e. 130 considered by the CME. Same was also cross checked in the submitted baseline survey & their corresponding results. Hence acceptable. CL closed.				

Type:	☐ CAR	☒ CL/CR	☐ FAR	Number: 05
Raised by:	VVB			Ref. to checklist in GS4GG FVaR: -
Description of the audit finding				Date: 01/03/2024
Under section C of VPA_DD 1. For section C.1.2, Expected operational lifetime observed to be inconsistent throughout the report. CME Shall clarify the same along with submission of supportive document to validate the same. Also, incorporate information in line with VPA-DD Template Filling Instructions, Version 2.3.				
Project Participant's response				Date:
1. According to the technical specification manual, the technical life of the water purifier is 15 years. The life of the cartridge will be varied between 1.5 to 2 years which will be replace as per requirements. Section C.1.2 is now updated in VPA-DD.				
Documentation provided as evidence by Project Participant				
1. Technical specification manual				
Auditor's assessment comment				Date: 03/05/2024
Technical specification of water filter as provided by the manufacturer GHG Reduction Technologies Pvt. Ltd. was submitted by CME, wherein it was checked that the expected operational lifetime of the water				

filter is 15 years, same has also been updated under the section C.1.2 of the revised VPA-DD version 2.0. therefore acceptable. CL closed.

Type:	☐ CAR	☒ CL/CR	☐ FAR	Number: 06
Raised by:	VVB			Ref. to checklist in GS4GG FVaR: -
Description of the audit finding				Date: 01/03/2024
Under section E of VPA_DD 1. For section E.1, Incorporated email date 01/06/2023 should be prior to stakeholder consultation meeting as , CME shall clarify how this date is complies with para 3.1.3 and para 3.2.1 of STAKEHOLDER CONSULTATION AND ENGAGEMENT REQUIREMENTS , version 2.1.				
Project Participant's response				Date:
1. It was a typographical error. The global stakeholder was invited on 04/05/2023 for stakeholder consultation meeting which is prior to the start date of the project as per STAKEHOLDER CONSULTATION AND ENGAGEMENT REQUIREMENTS, version 2.1. The same has been corrected in VPA-DD.				
Documentation provided as evidence by Project Participant				
1. EML file for the invitation for global stake holder.				
Auditor's assessment comment				Date: 03/05/2024
As per the submitted local stakeholder consultation documents such as invitation letter, list of attendees and feedback by the CME, it was confirmed that invitation date via public notice/email is 04/05/2023, meeting date is 10/05/2023 and the start date of VPA is 11/05/2023, which is chronologically correct for a regular VPA and in line with 4.12.8 of the GS PoA requirements. Thus, acceptable to VVB and this part is closed. CL closed.				

Table 3. CARs from this validation

Type:	☒ CAR	☐ CL/CR	☐ FAR	Number: 01
Raised by:	VVB			Ref. to checklist in GS4GG FVaR: -
Description of the audit finding				Date: 01/03/2024
Under section B of submitted VPA-DD: 1. In section B.2 of VPA_DD, kindly indicate meth name, version, para reference while demonstrating applicability conditions of applied methodology. 2. In section B.3 of VPA_DD, CME shall demonstrate compliance of para 3.1.1 for project boundary in correspondence to current VPA. 3. In section B.4 of VPA_DD, Kindly incorporate para/sub para reference of 3.4.1 and 3.4.2 (suppressed demand) to demonstrate baseline scenario of VPA. 4. In section B.4 of VPA_DD Direct value of FnRB has been incorporated under, tab, "Parameters" Estimated ER Spreadsheet, CME shall demonstrate calculation done for state Madhya Pradesh. 5. In section B.5 of VPA_DD, CME shall include condition's (a), (b) & sub -parts mentioned as per the VPA-DD template filling requirement and demonstrate accordingly.				
Project Participant's response				Date: 16/04/2024

1. Section B.2 of the VPA-DD is now included meth name, version and para reference.
2. Section B.3 of VPA-DD has been updated as per applied methodology para 3.1.1.
3. Section B.4 of VPA-DD has been incorporated with section 3.4.1 and 3.4.2 as per applied methodology.
4. An individual Fnrb calculation spreadsheet has been provided for Madhya Pradesh state.
5. Section B.5 of VPA-DD has been updated as per template filling guidelines.

Documentation provided as evidence by Project Participant
1. VPA-DD_v02 2. Fnrb calculation sheet

Auditor's assessment comment	Date:	03/05/2024

Under section B of submitted VPA-DD:

1. Section B.2 of the VPA-DD version 2.0 has been updated while mentioning the correct applied meth name, version along with para reference i.e. para 2.2 "Emission reduction from safe drinking water supply", version 1.0 and demonstrating which is found to be consistent with the applied methodology. Therefore, this point is closed.
2. Section B.3 of the VPA-DD version 2.0 has been updated mentioning the proper description regarding the project boundary of the VPA, i.e. Dindori and Anuppur district in Madhya Pradesh state of India as cross checked against the submitted KML file, which is now in line with the para 3.1.1 of the applied GS methodology. Therefore, acceptable. This part is thus closed.
3. In line with para 3.4.1 & 3.4.2 of the applied methodology, CME has now described the baseline scenario with respect to the practices of unsafe drinking water in the pre-project scenario under the section B.4.2 of the VPA-DD version 2.0, which is observed to be consistent during the on-site inspection, as confirmed by the local stakeholder during the interview. Therefore, this part is closed.
4. Value of fNRB as mentioned under section B.4 of the VPA-DD i.e. 89.20% has been cross checked with the submitted fNRB calculation sheet for the Madhya Pradesh state which is the VPA implementation area, in line with the para 7 of the CDM Tool 30 version 04.0 was found to be consistent, hence acceptable to VVB. This part is therefore closed.
5. In line with the latest VPA-DD template guidelines, CME has now demonstrated the additionality conditions under section B.5, wherein in accordance with the para 1.1.3 of the annex B of GS CSA Requirements version 1.2, the annual energy savings of each project unit is less than 600 tCO_2e/ yr as reflected in the estimated ER calculation sheet. All the applied formulae were found to be as per the applied GS methodology. Therefore, this part is closed.

CAR closed.

Type:	☒ CAR ☐ CL/CR ☐ FAR	Number:	02
Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024

Under section B.6.1 of VPA_DD

1. CME shall incorporate para reference, applied meth name, version etc while referring equations for calculating baseline and project outcomes. in line with GS4GG VPA.
2. CME shall demonstrate project emission in line with para 3.7 & pertaining sub -paragraphs of applied methodology.

3. Kindly demonstrate by referring para reference (3.8 & Sub para) for calculating leakage emission for current VPA.

Under section B.6.2 of VPA_DD

1. Monitoring Table format shall be required to incorporate in-line with VPA DD Template, Version 2.3.
2. CME shall include information by differentiating Improved /Un-improved water resources in-line with requirement for parameter SWDS 5.
3. For SDWS 7, If the expected technical life of the project technology is shorter than the crediting period, describe the measures to ensure that end users are provided replacement systems of comparable quality, e.g. replace with comparable or better technology, retrofit with performance guarantee, etc. This applies to both new and rehabilitated technology.
4. For SDWS 8, The percentages applied shall be cross-checked against at least one other source on the list. For cross-check purposes, sources applied may be up to 5 years old. In-line with applied methodology monitoring table requirement for parameter SDWS11.

Under section B.6.3 of VPA_DD

1. CME shall incorporate para reference, applied meth name, version etc while referring equations for calculating baseline and project outcomes. in line with GS4GG VPA
2. Baseline emission observed to be inconsistent with submitted ER spreadsheet corrective action shall be required
3. CME shall submit the demonstrated summary of following indicators under the Estimated ER spreadsheet: **Indicator 1.4.1, Indicator 3.9.1, Indicator 4.3.1, Indicator 5.4.1, Indicator 5.4.1, Indicator 6.1.1, Indicator 8.5.1, Indicator 9.2.2.**

Project Participant's response	Date:	16/04/2024

Under section B.6.1 of VPA_DD

1. Para reference, applied meth name, version etc has been updated in the relevant section of the VPA-DD.

2. Project emission has now inline and updated as per applied methodology para 3.7.

3. As per applied methodology para 3.8 incorporated for calculating leakage emission for the current VPA-DD.

Under section B.6.2 of VPA_DD

1. Monitoring table has been now updated as per VPA-DD template, version 2.3.

2. SDWS 5 has been updated.

3. The expected life of the project technology is 15 years which covers the whole project crediting period. The life of the cartridge is 10,000 litres which will replace as per usage rate. Also, the cartridge replacement records and database managed by CME.

4. The percentage applied may be crosschecked from monitoring survey reports and the same has been included in the revised version 02 of VPA DD.

Under section B.6.3 of VPA_DD

1. 1. Para reference, applied meth name, version etc has been updated in the relevant section of the VPA-DD v02.

2. Baseline emissions has been revised as per the latest submitted ER Sheet and the same values has been depicted in the VPA DD

3. Summary of all the SDG contributions has been depicted in the ER Sheet as well as VPA DD

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Documentation provided as evidence by Project Participant		
1. VPA-DD_v02 2.Product technical specification 3. ER Spreadsheet		
Auditor's assessment comment	Date:	14/05/2023

Under section B.6.1 of VPA-DD

1. In line with the GS4GG VPA template, CME has updated the para reference, applied meth name, version etc. while referring equations for calculating baseline and project outcomes, hence in line with the GS4GG template requirements. Therefore this part is closed.
2. Relevant section of the revised VPA-DD has now been addressed with the applied Project emissions formula which is in line with the para 3.7 of the applied methodology. Hence this part is closed.
3. Leakage emission for the current real case VPA has now been incorporated in both the revised VPA-DD and the corresponding ER Calculation sheet, which is now in line with the para 3.8 of the applied methodology. Therefore, this part of CAR is closed.

Under section B.6.2 of VPA_DD

1. The revised VPA-DD version 2.0 now includes the updated monitoring table, which is found to be in line with the GS4GG VPA-DD template requirements. Hence this part is closed.
2. The SDWS 5 of the monitoring parameter has been updated with the proper water resource description, which has been taken from the conducted baseline survey by CME. Same was found to be consistent with the baseline survey sheet submitted by the CME. Therefore, this point is closed.
3. Under the section B.6.2 of the revised VPA-DD, it was found that the lifetime of the project technology is 15 years and the life of the cartridge which is 10,000 Liters, as confirmed from the technical manufacturer's specifications. All the relevant records such as usage survey results, cartridge replacement records & the project database is maintained by the CME, which was cross checked by the VVB, and was found to be consistent with the information provided in the VPA-DD. Therefore, this point is closed.
4. For SDWS 8, the revised VPA-DD includes the reference sources which are as available at the time of the conducted baseline survey, which is acceptable to VVB. Therefore, this part of CAR is closed.

Under section B.6.3 of VPA_DD

1. Section B.6.3 of the revised VPA-DD which involves the claimed SDG tables now includes the accurate para reference, applied meth name, version etc while referring equations for calculating baseline and project outcomes, which is now in line with the GS4GG VPA template guidelines. Therefore this part is closed.
2. The latest version of the submitted ER Calculation sheet now involves the corrected formula of baseline emissions and Emission reductions henceforth. Same has also been incorporated under the relevant section of the latest version of VPA-DD, which is consistent and thus acceptable. Hence this part is closed.
3. SDG calculations and their respective values are now revised as per the applied GS4GG methodology and further put correctly in the SDG tables of the revised VPA-DD, therefore this part of CAR is closed.

CAR closed.

Type:	☒ CAR	☐ CL/CR	☐ FAR	Number:	03

Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024

Under section B.7.1 of VPA_DD

1. For SDWS 29, Kindly include version name and weblink which sampling version of CDM has been incorporated for current VPA.
2. For SDWS 35, Kindly demonstrate Sources established by following Leakage emissions section and further submit Leakage Survey Records used for current VPA in baseline.

Project Participant's response	Date:	16/04/2024

1. Version name and weblink has been updated in the relevant section of the VPA-DD.
2. As per the applied methodology leakage emissions are considered as negligible however on a conservative side 5% emission reductions are deducted from baseline emissions to quantify actual emission reductions achieved

Documentation provided as evidence by Project Participant

1. VPA-DD_v02

Auditor's assessment comment	Date:	04/05/2024

Under section B.7.1 of VPA_DD version 2.0,

1. Parameter table of SDWS 29, sampling guideline used for the calculation applied is CDM Guidelines for sampling and surveys for CDM project activities and programmes of activities version 09.0 which is the latest one as per the CDM website, hence acceptable to VVB. Therefore, this part is closed.
2. VVB has assessed the CME response, according to which 3.8.1 of the applied methodology has been followed. CME has adjusted the emission reductions by 5 % due to which parameter SDWS 35 is not monitored. Thus, PD has removed the SDWS35 table considering the VPA to be micro scale and in a conservative manner 5% of total emission reductions has been considered as leakage. Hence acceptable. Therefore, this part of CAR is closed.

   CAR closed.

Type:	☒ CAR ☐ CL/CR ☐ FAR	Number:	04
Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding		Date:	01/03/2024

Under section C of VPA_DD

1. For section C.1, With reference to VPA-DD filling instructions Template, Version 2.3, CME shall incorporate Define the start date as per GS4GG Principle 4 of applied Activity/Product Requirements
2. For section C.1.3, CME shall incorporate information in the format in-line with VPA-DD Template Filling Instructions, Version 2.3.

Project Participant's response	Date:	16/04/2024

Under section C of VPA_DD

1. The start date of the VPA-DD is the start date of distribution of first Econeer water filter i.e., 11/05/2023 The same has been clearly mentioned in VPA-DD. Also, distribution database, beneficiary distribution form and end user agreement has been now provided.

2. Section C is now updated as per VPA-DD template Filling Instructions, Version 2.3.

Documentation provided as evidence by Project Participant

1. Distribution database, beneficiary distribution form and end user agreement. 2. VPA-DD_v02		
Auditor's assessment comment	Date:	04/05/2024
Under section C of VPA-DD version 2.0, 1. The start date of the VPA-DD is 11/05/2023, which was cross confirmed against the submitted beneficiary distribution form & signed end-user agreement between the beneficiary & CME. Same has been updated in the section C of revised version of VPA-DD, which was found to be consistent, therefore this part is closed. 2. Formatting errors such as dd/mm/yyyy format for total length of crediting period have now been rectified in line with the VPA -DD template guidelines. Therefore, this part is closed. CAR closed.		

Type:	☒ CAR	☒ CL/CR	☐ FAR	Number:	05
Raised by:	VVB			Ref. to checklist in GS4GG FVaR:	-
Description of the audit finding				Date:	01/03/2024
Under section E of VPA_DD CME shall submit supportive document of stakeholder consultation which include following 1. Attendance sheet 2. Photographs 3. MOM 4. Feedback forms 5. Invitation /Notice's 6. Email /telephonic invitation evidences.					
Project Participant's response				Date:	16/04/2024
Under section E of VPA_DD supportive document of stakeholder consultation which include Attendance sheet, LSC meeting photographs, feedback form, public notice and email evidence has been now provided.					
Documentation provided as evidence by Project Participant					
Under section E of VPA_DD 1. Attendance sheet, LSC meeting photographs, feedback form, public notice and email evidence.					
Auditor's assessment comment				Date:	06/05/2024
Under section E of VPA-DD version 2.0, Submitted LSC invitations both via email & public notices, meeting photographs and feedback forms were checked by the VVB, wherein it was found that the chronology for all is consistent with the ones mentioned under the section E of the VPA-DD, which is also in line with the GS Stakeholder consultation and engagement requirements version 2.1. hence acceptable. CAR Closed.					

Type:	☒ CAR	☒ CL/CR	☐ FAR	Number:	06

Raised by:	VVB	Ref. to checklist in GS4GG FVaR:	3
Description of the audit finding		Date:	01/03/2024
Under appendix 1 of VPA_DD: CME shall revise the template and associated format for Safeguarding Principles Assessment in line with GS4GG VPA-DD filling instructions, Version 2.3.			
Project Participant's response		Date:	
The VPA-DD is now updated on the latest available VPA-DD version v2.3 template.			
Documentation provided as evidence by Project Participant			
VPA-DD_v02			
Auditor's assessment comment		Date:	06/05/2024
Appendix 1 of the revised VPA-DD version 02.0 was checked by the VVB, and it was found to be updated in line with the latest GS4GG VPA template filling guidelines, therefore acceptable. Therefore, this part is closed. CAR Closed.			

Table 2. FAR from this validation

Type:	☐ CAR ☐ CL/CR ☒ FAR	Number:	01
Raised by:	SustainCert	Ref. to checklist in GS4GG FVaR:	Design review
Description of the audit finding		Date:	01/03/2024
N/A			
Project Participant's response		Date:	
Documentation provided as evidence by Project Participant			
Auditor's assessment comment		Date:	

Appendix 2: Audit Team CVs

Name	SHORT CV. (BACKGROUND INFORMATION)
Mr. Deepak Pundlik	Mr. Deepak Pundlik has an experience in climate change, waste management and environmental management. After completing Masters in Environment Sciences from Pune university, He has worked in waste management field. As a GHG consultant, He handled projects under renewable energy, waste management sectors during his stint with companies - MITCON and Thermax. Post Thermax, Deepak was involved in organic farming research project with Tata Institute of Social Sciences. As a GHG auditor, He has validated/verified projects under CDM/VCS/GS and GCC mechanisms from renewable energy, energy demand, waste management sectors. Mr. Deepak Pundlik is based in Pune, India. He participates as a Lead Auditor and Technical Expert for the assessment. Currently he is associated with True Quality Certifications Private Limited (Applus+ Certification's Outsourced Entity).
Mr. Amit Rai	Mr. Amit Rai, has done Bachelor of Technology in Electrical & Electronics Engineering from Dr. A.P.J. Abdul Kalam Technical University, India and Government Certified Competency Class – I, Electrical Supervisor from Government of National Capital Territory of Delhi, India. He has more than (7) years of working experience in different organizations like Sunrator Technologies, Sun Source Energy Private Ltd. (SHV Energy Group, Singapore) & KBS Certification Services Private Ltd. (UNFCCC's – DOE), In the area of Renewable Project Management, Execution, Designing & Climate Change Services. Currently he is associated with True Quality Certifications Private Limited (Applus+ Certification's Outsourced Entity) and empanelled with Applus+ Certification to carry out GHG audits in the aforementioned schemes. Mr. Amit Rai is based in Delhi, India. He participates as an auditor in the project team.
Ms. Shruti Shrivastava	Ms. Shruti Shrivastava holds a Master's degree in Environmental Sciences from Amity University, Noida completed in 2021, and completed Bachelor's in Zoology Honors. She has a working experience of over two years in the climate change field. Currently, she is associated with True Quality Certifications Pvt. Ltd. (An Outsourced entity for LGAI Technological Center, S.A. (Spain) since March 2023, wherein she has been involved in supporting Audit teams for the validation & verification of Project activities (renewable & non-renewable projects) under different GHG schemes such as CDM, VCS,

	GS & GCC. She started working professionally in the field from October 2021. Ms. Shruti Shrivastava is based in Indore, India. She participates as an auditor in trainee for the current assessment.
Mr. Simon Shen	Mr. Simon Shen (Master's Degree in Thermal Energy Engineering, Bachelor's Degree in Environmental Engineering) is an Auditor appointed by Applus+ Certification (LGAI Technological Center, S.A) for the GHG project assessment, auditing and technical review. He worked with TUV SUD for 3.5 years and holds experience as GHG Auditor and ISO 9001/14001. Since 2014, Mr. Simon Shen works as an external individual in Applus+ Certification (LGAI Technological Center, S.A). He holds experience in CDM/GS4GG/VCS project assessment and technical reviews for the sectoral scopes 1.1/1.2/3.1/13.1/13.2. At the time, he participated in plenty of Chinese CCER audits and enterprises carbon emissions verifications. Mr. Simon Shen has extensive experience also as former Applus+ Shanghai CDM Technical Manager. Mr. Simon Shen is based in Shanghai, China. Mr. Simon Shen may participate as part of the Technical Review experts' panel.

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Appendix 3: Assessment of Non-renewable biomass

Determination of F_{nrb} value:

The fraction of woody biomass (fuel wood) that can be established as non-renewable is given by:

$$f_{NRB} = \frac{NRB}{NRB + RB}$$

Where:

f_{NRB}	=	Fraction of non-renewable biomass in the applicable area in the relevant period (fraction or %)
NRB	=	Quantity of non-renewable biomass consumed in the applicable area in the relevant period (tonnes)
RB	=	Quantity of renewable biomass that is available on a sustainable basis in the applicable area in the relevant period (tonnes)

Commercial use of woody biomass (fuel wood) for non-energy purposes (such as building or furniture) that is derived from forests or other land areas in the relevant area (tonnes)

NRB = H – RB

Where:

H	=	Total consumption of woody biomass (fuel wood) in the applicable area in the relevant period (tonnes)

The following equation accounts for all consumption within the relevant area to determine the overall consumption of woody biomass (fuel wood) (H).

H = HW × N + CE + NE

Where:

HW	=	Average consumption of wood fuel per household, including fuelwood and charcoal, in the applicable area in the relevant period (tonnes//household)
N	=	Number of households consuming wood fuel within the applicable area in the relevant period (number)
CE	=	Commercial woody biomass (fuel wood) consumption for energy applications (e.g. commercial, industrial or institutional uses of woody biomass (fuel wood) in ovens, boilers etc.) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

NE = Commercial woody biomass (fuel wood) consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or other land areas in the applicable area in the relevant period (tonnes)

As the parameters HW and N, disaggregated value is not provided, hence CME has used an aggregated value of (H × N) in the calculations.

	HW × N (million tonnes)	CE (Million tonnes)	NE (Million tonnes)	**H (Million tonnes)**
Madhya Pradesh	13.665[25]	0	20.449	**34.114**

Cross check for the total consumption of Wood fuel in households of Madhya Pradesh state:

Additionally, the fuel wood demand has also been cross verified using an alternative approach (as specified in Data/Parameter Table 1 of Tool 30) by using default value of woody biomass consumption per person, as given in Tool 33, multiplied by the average household size[26]. When compared to the FSI estimates, the FSI-derived values were found to be more conservative and thus accepted.

CME has considered the values for the above parameters from Government of India report which gives the values which are most recent.

Procedure to estimate the quantity of renewable biomass available (RB):

$$RB = \sum\left(MAI_{forest,i} \times \left(F_{forest,i} - P_{forest,i}\right)\right) + \sum\left(MAI_{other,i} \times \left(F_{other,i} - P_{other,i}\right)\right)$$

Where:

RB = Renewable Biomass

$MAI_{forest,i}$ = Mean Annual Increment of woody biomass growth per hector in sub-category i of forest areas in the relevant period (tonnes/ha/yr).

$MAI_{other,i}$ = Mean Annual Increment of woody biomass growth per hector in sub-category i of outside areas in the relevant period (tonnes/ha/yr).

$F_{forest,i}$ = Extent of forest in sub-category i in the relevant period (ha)

$F_{other,i}$ = Extent of forest in sub-category i in other land in the relevant period (ha)

$P_{forest,i}$ = Extent of Non-accessible area within forest areas in the relevant period (ha)

$P_{other,i}$ = Extend of other land in sub-category i in the relevant period (ha)

Mean Annual Increment of woody biomass growth per hector in sub-category i of forest areas in the relevant period (tonnes/ha/yr)[27]

$MAI_{forest,I}$ = 1.66 tonnes/hectare/year

[25] https://fsi.nic.in/cover_2011/chapter7.pdf#page=11
[26] https://censusindia.gov.in/census.website/data/census-tables
[27] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf

$MAI_{other,I}$ = 1.66 tonnes/hectare/year

$MAIforest,i$	$MAIother,i$	$Fforest,i$ (Million Ha)	$Pforest,i$(Million Ha)	$Fother,i$(Million Ha)	$Pother,i$ (Million Ha)
1.661	1.661	7.749[28]	7.610[29]	2.078[30]	0

The fraction of woody biomass that can be established as non-renewable for all locations:

H	**RB**	**NRB**	**Fnrb**
34.114	3.683	30.431	**89.20%**

An assessment of few parameters is presented below which is checked and confirmed based on submitted excel sheet and publicly available data:

Wood Consumption

The wood consumption is estimated as sum of fuel wood consumption and consumption of commercial wood.

Parameter	Value	VVB Assessment
Average Fuel Wood Consumption per household	13.665 million Tonne	VVB confirmed that the state of forest survey report from year 2011 for the state of Madhya Pradesh is the most recent data available for value of fuelwood usage. VVB acknowledge that the referred data is in accordance with paragraph 10 of tool 30. Since the value of fuel wood consumption in year 2022 would be different from the report in year 2011 which is appropriate and hence accepted. In view of the same, the value of fuel wood as per estimated value from MoEF&CC for fuel wood is found more appropriate. The values and calculation presented in the excel sheet was checked and found appropriate. The value of fuel wood consumption as 13.66 million tonne

[28] https://fsi.nic.in/isfr-2021/chapter-13.pdf#page=116
[29] Calculated value: Refer fNRB calculation sheet for the details (for the ratio of protected and reserved forest please refer link: FSI_ISFR_2021_Chapter 1,Table 1.2.pdf
[30] https://fsi.nic.in/isfr-2021/chapter-13.pdf#page=121

		as per https://fsi.nic.in/cover_2011/chapter7.pdf is found appropriate by the assessment team.
Commercial woody biomass consumption for non-energy applications	20.449 million tonne	The value of parameter is estimated based on the most recent available data by CME i. e. state of forest report 2011 and 2019 combinley. This is found appropriate and conservative while sourcing most recent data available in specific category for calculating commercial woody bio-mass consumption for non-energy applications (NE) as per the tool requirement and hence acceptable to VVB..

Renewable Biomass-

Parameter	Value	VVB assessment
Mean Annual Increment	1.66 tonnes/hectare/year	CME has considered the mean annual increment of India Forest as published under Chapter 4 of Forest Land of "2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories[31]" which is checked and hence accepted. Since the value considered is the publicly available statistics, same is acceptable to VVB.
Extent of Non-accessible area within forest areas in the relevant period (ha)	7.61 Million /hectare	The value is obtained by CME based on the most recent India State of Forest Report 2021 for the sate Madhya Pradesh published by Forest Survey of India, MoEF&CC, Govt of India. Since the most recent data is used for the value of the parameter, same is found acceptable.
Extent of forest in sub-category i in the relevant period (ha)	7.75 Million/Hectare	CME has used the value related to area forest under sub -category from latest State of Forest Report 2021 (chapter 13) published by Forest Survey of India, MoEF&CC, Govt of India.

[31] https://www.ipcc-nggip.iges.or.jp/public/2019rf/pdf/4_Volume4/19R_V4_Ch04_Forest%20Land.pdf

		Since the most recent date is used for the value of the parameter, same is found acceptable.

VVB noted that based on the above values, CME has calculated fNRB value in the excel sheet in line with tool 30 and same is checked and found acceptable. The calculated value of fNRB is 89.20% for the state of Madhya Pradesh (geographical location of the project activity).

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